DRAFT for Approval

Southern Sierra

Integrated Regional Water Management Plan

Prepared by the Southern Sierra Regional Water Management Group and Kamansky's Ecological Consulting

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Executive Summary

The Southern Sierra Integrated Regional Water Management Plan (SSIRWMP) has been an ongoing collaboration which began in April of 2008. It is a compilation of information from stakeholders throughout the Southern Sierra Integrated Water Management Region including local data, Regional issues, water-related objectives, resource management strategies, and collaborative and public processes. Public meetings, surveys, stakeholder meetings, board meetings, workshops, and symposia helped create this plan. It includes a list of issues, goals, objectives, management strategies, and projects for the Region. More specifically, the SSRIWMP also includes chapters on: Region description, governance, climate change, data management, integration, finance, monitoring, impacts and benefits, coordination, and recommendations. This structure was developed to be compliant with the State of California's Department of Water Resources standards for integrated regional water management planning and is reflected in the summary below. The Plan will be updated during a planning period 2013-2015, funded by a Department of Water Resources planning grant.

Southern Sierra Region Description

The Southern Sierra Region of California is approximately 6,195 square miles, making it the fourth largest IRWM region in the state. The waters in the SSIRWM region are typically high quality and flow from the peaks of the Sierra Nevada to the Tulare Lake and San Joaquin River Hydrologic Regions in the Southern San Joaquin valley. The upper watersheds of the Kern, White River, Deer Creek, Tule, Kaweah, Kings, and San Joaquin watersheds are all included in the Southern Sierra IRWMP. These watersheds cover portions of Madera, Fresno, and Tulare counties. Taken as a whole, the SSIRWM region comprises the primary watersheds, or water source, for the communities and agricultural operations on the San Joaquin Valley floor. The wildlands of the Sierra National Forest, Sequoia-Kings National Park and Sequoia National Forest comprise much of the Region at higher elevations, while lower elevations in the foothills are primarily private lands.

There are both water supply and water quality issues in the SSIRWM Region. All of the rivers are fully appropriated and there is a growing concern that additional demand could create conflicts and/or water shortages. With the demand increasing, the supply will need to increase and/or water use efficiency will need to increase. Groundwater resources are scarce and decreasing, and may not be a reliable source for long-term supply. Ensuring that water quality remains high means that several issues need to be addressed. Some of the Region's water quality issues include: the need to restore ecosystems, drinking water and treatment systems below California and national standards, sediment buildup in storage facilities, agricultural runoff, post-fire sediment, groundwater pollution, septic systems in

need of updating, and impacts from recreation. Improving water supply and water quality in the SSIRWM region are primary goals of this IRWMP.

Governance

Governance plays a vital part in the formation of this Integrated Regional Water Management Plan. Having structured governance demonstrates the strength of the community, capacity for collaboration and thereby the future success of the developed plan. The SSIRWMP was initiated through the actions of the Sequoia Riverlands Trust, Sierra Nevada Alliance, and the Sierra Nevada Conservancy. Following the initial meeting in the spring of 2008, the IRWM participants began aggressively growing public outreach and monthly meeting attendance. There are two committees within the group. The Regional Water Management Group (formerly the Planning Committee) is the decision-making body. It oversees and approves major decisions such as funding applications and performance measures. The Coordinating Committee, appointed by the Regional Water Management Group, is a smaller, representative group that meets between Planning Committee meetings. The Coordinating Committee provides staff with advice on process planning, plan substance, communications, and other issues as needed.

A Memorandum of Understanding formally creating the Southern Sierra Regional Management Group was signed by a core group of participants in 2009 including the Springville Public Utility District, the Sierra Resource Conservation District, Sequoia Riverlands Trust, Sequoia National Forest, the California Department of Fish and Wildlife, Yosemite/Sequoia Resource Conservation and Development Council, Desert Mountain Resource Conservation and Development Council,

Disadvantaged communities (DAC) are also a growing concern when dealing with water issues in the SSIRWM Region. In order to help serve the regions DAC's, the RWMG has dedicated resources to improving DAC participation by creating outreach meetings in DAC areas, travel and participation stipends for DAC representatives to attend meetings and workshops, and resources to assist the DACs in establishing watershed committees. These approaches contribute to sustainable promotion of public education and community involvement in natural resources planning and project implementation.

Climate Change

Climate change is currently becoming a critical issue when dealing with water resources. With the Southern Sierra Region having some of the state's most iconic natural resources, such as giant sequoia groves, climate change dramatically impacts on the area. Increasing temperature and changes in precipitation have already been observed, causing fluctuations in water yield and timing of run-off. There is growing recognition that global climate change will affect long-term management options for the conservation of the Region's

resources. The California Department of Water Resources has stated that climate change is an integral part of the IRWMP and has identified that Greenhouse Gas Emissions (GHG) constitute a potentially significant impact to climate change. In order to address increasing GHG emissions and climate change, this IRWMP identifies ways to deal with climate change through strategies of adaptation and mitigation resulting in greater ecosystem resiliency.

Goals, Objectives and Their Metrics

This chapter summarizes goals and objectives, with their associated metrics to monitor success, respond to the water supply, water quality, and floodwater management issues unique to the Southern Sierra region. Related issues of land use planning and public education are also examined. All objectives are developed within the context of climate change.

Project Review Process

The Project Review Process is the process used for submitting, reviewing and selecting projects. The process is documented and the results communicated to the public in this chapter. There are four basic components: 1) procedure for identifying projects, 2) procedure for submitting a project for review, 3) procedure for review, 4) procedure for communicating the selected list of projects. All projects selected for implementation funding will assist in implementing the SSIRWMP.

Projects

Projects recommended in this IRWMP generally fall into one or more of the following categories: best management practices, studies, plans, demonstration projects, DAC projects, tribal projects, and restoration projects. Three tiers of projects are defined based on readiness of the project to proceed. First tier projects are ready or nearly ready for implementation; the second tier may have a project proponent but is not ready for implementation or has a description from stakeholders, but no proponent while third tier projects are sound ideas but are yet without a proponent or a sufficient description and details to plan for the project's implementation.

Integration, Implementation, Plan Performance, Coordination, and Collaboration

The Southern Sierra IRWMP provides an integrated planning framework and management structure from which local and regional water management policies, projects, and programs can be formulated, evaluated, and implemented. The Southern Sierra RWMG established regional goals, objectives and resource management strategies through a collaborative progress, which lay a framework for selecting implementation projects. The projects identified herein describe how they contribute to the successful achievement of these goals and objectives. The project selection process has at least two phases: 1) identify

projects that will be necessary to implement the IRWM Plan and 2) identify projects that may quality for a specific funding source.

The RWMG has developed structures and processes that provide opportunities to foster integration. Integrated regional water management planning solicits the input and expertise of various groups, including National Forest Service and National Park Service, local and regional water agencies, flood control agencies, local planning entities, conservancies, public utility districts, business organizations, tribes, open space and recreation interests, and habitat preservation interests. Along with integration, plan performance and monitoring are an integral part of this plan. These include a management plan for monitoring responsibilities, reporting procedures, data management, and general criteria for project-specific monitoring including both qualitative and quantitative metrics as appropriate.

Technical Analysis

Many watersheds or parts of the watersheds are without roads or other infrastructure meaning that collecting, analyzing and making data accessible is very challenging. The Southern Sierra RWMG is composed of multiple jurisdictions, agencies, non-profit groups, tribes and communities. Therefore data management is key to disseminating the information and research the RWMG gathers. Along with data management, technical analysis is included in the IRWMP. The focus of this analysis is that it must be 1) regional in nature and 2) necessary for the development, improvement, or enhancement of the IRWMP.

Finance

The finance analysis identifies and evaluates potential funding sources for the Plan's updates, RWMG administration, grant applications, technical studies, implementation projects, and project operation and maintenance. The current funding for the program comes from grants from agencies, individuals and non-profits. To date, the RWMG received a $50,000 Sierra Nevada Conservancy grant to start up the program, conduct the outreach assemble technical data sources, hold public meetings and write the initial planning grant application to DWR and assemble many of the components of the Plan and supported the group with an additional $13,000 for professional facilitation when the RWMG was awarded a DWR facilitation services contract and beginning the contract was delayed. Initial resources were leveraged with in-kind services from consultants and participants in excess of $400,000. Facilitation enabled the group to submit another application to DWR for planning grant funds which was successful. The RWMG requested for additional facilitation services from DWR also in the amount of approximately $50,000. Up to the beginning of 2013, the RWMG has been successful in acquiring $643,000 in grants for

planning activities. In addition, stakeholders have contributed approximately $8,000 in cash for grant writing and facilitation.

Coordination and Collaboration

Coordination and Collaboration includes a process to coordinate with stakeholders in the region, including but not limited to federal, state and local agencies, landowners, NGO's, DAC's and Native American Tribes.

Impacts and Benefits

The impacts and benefits chapter identifies potential impacts and benefits of plan implementation within the region and between regions. The RWMG analyzed the plan and developed a discussion of the aggregated benefits of plan implementation as well as an analysis of possible impacts (including economic, environmental, and others) that might require mitigation.

Acknowledgements

The contents of this plan represent a culmination of four and a half years of planning activities, 2008-2013. This work could not have been possible without start up funding from the Sierra Nevada Conservancy and leadership and initiative from Sequoia Riverlands Trust and the Sierra Nevada Alliance. The core of the legal entity, the Regional Water Management Group, The Sierra Resource Conservation District, The Springville Public Utilities District and the Sequoia Riverlands Trust, all demonstrated visionary leadership throughout the planning process and continuing into the implementation of this IRWMP.

Compilation of this plan would not have been possible without in kind contributions from individuals such as Bobby Kamansky, Principal Biologist, Kamansky's Ecological Consulting, Allan Pearce, and Courtney Lewis, M.S. candidates, Antioch University, Tasha Newman and John McCaull, Conservation Strategy Group and Elissa Brown, grant writer and the official members, signatories to the Memorandum of Understanding.

Regions surrounding the SSIRWMP Region include the Inyo-Mono, Madera, Upper Kings, Kaweah, Tule, Poso and Kern IRWM regions. These regions shared information, collaborated on boundaries and continue to integrate across jurisdictional boundaries in the Tulare Lake and San Joaquin Funding Regions.

The Fresno office of the California Department of Water Resources also assisted the Region tremendously, providing guidance about policies, laws, grants and processes.

A note about the authors:
Bobby Kamansky – Led the planning effort since 2008 and the compilation of the plan with assistance from two graduate students who began working on the plan in October, 2012.

Allan Pearce – An Environmental Studies graduate student at Antioch University New England has worked closely with Bobby Kamansky and the RWMG in the compilation, writing and editing of this plan.

Courtney Lewis - An Environmental Studies graduate student at Antioch University New England has worked closely with Bobby Kamansky and the RWMG in the compilation, writing and editing of this plan.

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Chapter 1 - Introduction

This plan is the first compilation of extensive outreach efforts and feedback from stakeholders throughout the Southern Sierra (Integrated Regional Water Management) IRWM Region. It includes regional and local data, issues, water-related objectives, resource management strategies and collaboration. The contents of this plan represent a culmination of planning activities beginning in April of 2008, with funding from the Sierra Nevada Conservancy, and support and vision from Sequoia Riverlands Trust and the Sierra Nevada Alliance. The collaborative process is ongoing four years later. Dozens of public and collaborative meetings, public surveys, stakeholder and board meetings, workshops and symposia led to a comprehensive description of the Region, lists of issues, goals, objectives, management strategies and projects for the region. Planning activities led to collaboration, additional exchange of ideas, partnerships, project sponsoring and other support and built support for regional, collective water management planning and implementation.

This plan serves as a working document that the Southern Sierra Regional Water Management Group (RWMG) will update regularly. During a two-year planning process with funding from the California Department of Water Resources planned for 2013, the RWMG will update this plan, adding additional information and refining the contents to serve the Region further. This plan identifies several projects that can aid water management in the Region and are ready, or nearly ready, for implementation. The RWMG will seek funding for these projects from the California Department of Water Resources (DWR), but will also seek additional funding from other sources.

In addition, DWR granted facilitation services to the RWMG. As a result, a professional facilitator will be involved in plan updating. The RWMG anticipates a need for professional facilitation services at least until the planning phase is complete. As the region further plans and implements projects, the RWMG will seek to partner with DWR to understand the Region's resources better and to share and collaborate on new data sources and methods for integration.

Chapter 2 - Region Description

This chapter provides a description of the physical, social, and ecological characteristics of the Southern Sierra IRWM Region. Included herein are descriptions of the physiography of the Region, watersheds, human communities, geographic boundaries, water supply, demand, quality, and geographically adjacent coordination efforts. This description provides a context for the subsequent chapters that describe the needs and actions of the SSIRWM Region in more detail.

2.1 Overview

The Southern Sierra Region of California is the fourth largest IRWM region in the state, covering approximately 6,195 square miles (3,964,800 acres). This region is of great importance to the overall well-being of the state, not only for its provision of ecosystem services and abundant recreational opportunities, but also as a main source of water for California's thriving agriculture, energy production, wildlife species, habitats and corridors, and domestic water needs. The headwaters and mid-elevation watersheds of this region are relatively intact as they are managed almost entirely for public benefits by federal agencies; however, rapid climate change, habitat fragmentation, severe air pollution, altered fire regimes, and invasive species are stressing these landscapes. Changing population demographics, wildland/urban interface development, and other land use and natural resource demands already threaten the traditional working landscapes of the foothills.

Waters originating in the SSIRWM region are generally of very high quality and flow to the Tulare Lake and San Joaquin River Hydrologic Regions of the southern San Joaquin Valley. However, several water bodies are listed under the Clean Water Act as impaired (see section below). The region's water resources serve many critical functions including: human use and consumption; irrigation water for ranchers and valley-floor agriculture; vast mountain and foothill ecosystems; groundwater recharge for the Tulare Lake basin; and significant recreational uses. Within the SSIRWM Region lie the Sequoia and Sierra National Forests and Sequoia and Kings Canyon National Parks. Giant Sequoia groves, mountain meadows, abundant and unique flora and fauna, and miles of riparian habitat draw over 1.6 million visitors per year, which places a large burden on the region's water supply resources and the ability to treat wastewaters. Approximately 34,000 residents live in this region and rely primarily on limited and variable supplies of groundwater pumped from fractured rock aquifers, a resource not yet fully understood. An established network of over 12 dams and reservoirs provides water storage, flood control, energy and infrastructure protection for the Tulare Basin. These dams supply 2,973 megawatts of hydroelectric power, and provide annual storage of over 2,605,600 acre-feet of water. When released, the water is a critical component of the Valley's scenic resources, water-

dependent wildlife, agricultural water supply, and groundwater recharge efforts. Maintaining, protecting, and preserving the water supply and high quality of the SSIRWM Region's water is of statewide significance.

Heavy winter rainstorms, spring snowmelt, remnants of Pacific hurricanes, high-intensity non-tropical storms and landslide dam failures, make the potential for flooding a widespread issue in the Southern Sierra Region. During storms, ten to twenty inches of precipitation could fall in a single watershed in the Region, creating peak flows in excess of 50,000 cubic feet per second in major rivers. Spring snowmelt causes locally and regionally significant peak flows nearly every year after hot weather. Remnants of Pacific hurricanes could also create flooding through locally intense precipitation events, although they are rarer. High intensity non-tropical storms can also dump large amounts of water. These storms are usually called cloudbursts and cause flash floods and overwhelm drainage systems, potentially creating water quality problems. Although they could be typically thought of as summer storms, these could happen at any time of the year.

Preparing for future floods is an important aspect of regional water management that will need to be further analyzed and mapped. Flooding is expected to be exacerbated by climate change because of greater storm and precipitation intensity, more rapid runoff and higher landslide risk.

Landslides are significant sources of flood-related damage and risk in the southern Sierra. Steep slopes in narrow, incised or broad canyons with narrow bottoms and dramatic elevation gradients characterize the Region. Thus, landslides can form landslide dams, some as high 400 feet tall, blocking the river and impounding significant flood waters. Landslide dams could result in a 200 foot high wall of water, such as the one that came out of the Kern Canyon in Bakersfield during New Year's Day in 1868. Thus, landslide risk in the river corridors is linked to flood risk. Areas with high landslide risk should be mapped and contingency plans constructed for areas with high landslide and flood risk. Prominent areas with great flood potential because of the landslides include the Kings River Watershed (especially in and around the Cedar Grove Area), the Kern River Watershed, and the Kaweah Watershed (especially in and around the town of Three Rivers, where much of the private property is located near the River corridor.

Strategies such as watershed protection, riparian and floodplain restoration and protection, risk analysis and mapping and contingency planning can help to mitigate flood risk and minimize damage caused by inevitable flooding.

The rural lands of the Region are managed by numerous entities including the U.S. Forest Service (Sierra, Inyo, and Sequoia National forests and Sequoia National Monument), the National Park Service (Sequoia and Kings Canyon National Parks), Native American Tribes

(Tule River Indian Reservation, Big Sandy, and Cold Spring Rancherias), non-profit entities, special and public utility districts, and private landowners. Many of these land managers only engage with each other on a limited basis or not at all. In order to protect critical water resources in the SSIRWM region, increased coordination, collaboration and integration among the land managers and stakeholders of this region is essential.

2.2 Watersheds and the Regional Water Management Boundaries

The Southern Sierra IRWMP boundaries include the foothills and mountain headwater regions of the Kern, Poso, White River, Tule, Kaweah, Kings, and San Joaquin watersheds. These watersheds cover the Sierra Nevada portion of Madera, Fresno, and Tulare counties. The starting point for the regional boundary included the Sierra Nevada Ecosystem Project (SNEP) boundaries, but is adapted to sync with neighboring IRWMP efforts (See Figure 1).

Within the Southern Sierra IRWM Region, water generally flows from the crest of the Sierra Nevada mountain range in the east towards the Tulare Basin in the west. The streams flow from high mountain lakes, meadows, snowfield and a few glaciers, out of deeply incised watersheds with extensive coniferous forests in the mountains, through foothill regions with brush and annual grasslands. In the foothills lie the majority of the large dams. There are few population centers in the Southern Sierra; most of the population in Madera, Fresno and Tulare counties is centered in the Valley portions of the counties outside of the Region.

In the Sierra Nevada mountains and foothills, watersheds dominate water resource management operations and future water resource management options. Watersheds are logical regions for planning purposes; however they can create challenges regarding coordinating and integrating management activities. The large, remote geographic region with a scattered and sparse population limits access and creates travel boundaries. Therefore, consideration of watersheds as a boundary feature must be balanced with the potential for the functional participation of interests and travel times to meetings. In addition, the desires of the stakeholders in various areas must be respected and to the extent possible, integrated with a regional perspective, regarding the region with which they wish to be associated.

In the RWMG/Planning Committee's boundary discussions, consideration was given to a number of factors including, but not limited to: Land use and water management, political boundaries, water agency service area boundaries, physical characteristics of the landscape, streams and watersheds, water related man-made infrastructure, agency service areas, and major governmental ownership such as national forests and national parks. There was recognition that the area under consideration did not have a defined

groundwater table or basin, and was predominantly one of fractured granite groundwater sources. Groundwater resources in the Southern Sierra Region are difficult to quantify.

Below are the descriptions of the watersheds in the SSIRWMP Region and their water management portfolios. All of these watersheds could benefit from projects designed to achieve multiple objectives such as: implementing strategic plans for local water agencies, meadow restorations, fuel breaks and fuel treatments, comprehensive water studies, ecosystem restoration and invasive species removal.

San Joaquin River Watershed

Managing entities in the San Joaquin River watershed within the SSIRWMP Region include the Sierra Resource Conservation District, Southern California Edison, Pacific Gas & Electric, Fresno County, ditch companies, The New Auberry Water Association, Friant Water Users, National Park Service – Sequoia and Kings Canyon National Parks, Sierra National Forest, US Bureau of Reclamation, California State Parks, and Millerton State Park.

Significant issues for the San Joaquin Watershed include: downstream flooding after wildfire and wildfire impacts on water quality, wildlife connectivity, groundwater availability, water quality and management. The relationship between land use and water quality and quantity has received much attention.

This watershed has the greatest level of water management, planning and implementation, including groundwater management planning by the Sierra Resource Conservation District (RCD), the Upper San Joaquin River Watershed assessment, watershed coordination (there is no current watershed coordinator, but for several years the Department of Conservation funded one), groundwater contamination studies, the Millerton Area Plan, Fresno and Madera County general plans, the Madera IRWMP (the Madera RWMG and the SSRWMG have an MOU designed to promote co-management of the upper SJR Watershed), Sierra National Forest's Forest Management Plan, Sequoia and Kings Canyon National Parks General Management Plan, meadow ranking on Sierra National Forest/watershed improvement database, Southern California Edison Forest Management Plan, and various public and private timber harvest plans.

Sierra RCD's work on a groundwater management plan for eastern Fresno County and the Upper San Joaquin River Forum/Assessment, various NEPA processes, the Fresno County General Plan, as well as the Willow Creek Forest Collaborative are examples of collaboration and public involvement in the watershed.

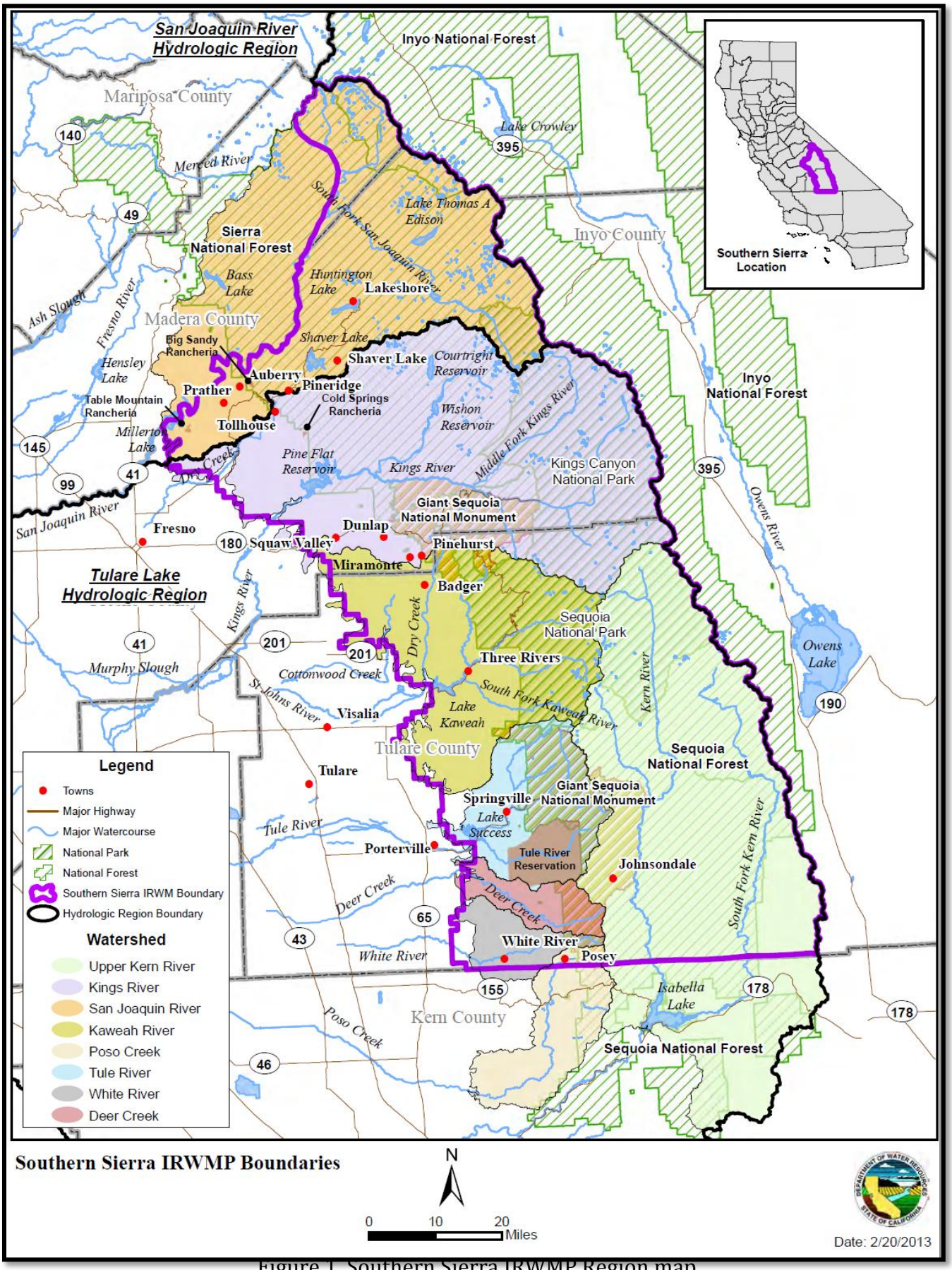

Figure 1. Southern Sierra IRWMP Region map.

The Sierra RCD and Fresno County collaborated on the groundwater contamination studies with DWR and the Sierra National Forest regularly collects and shares data. Various studies and research occurred or will occur in the Upper San Joaquin River including the watershed assessment and the Millerton Area Plan.

Ongoing projects in the watershed include meadow restoration on the Sierra National Forest, THPs, prescribed fires on private and national forest lands, and Sierra RCD's groundwater investigation.

Kings River Watershed

The Kings River Watershed has limited capacity to increase their water management portfolio. Managing entities in the Kings River Watershed include the Army Corps of Engineers, Fresno Metropolitan Flood Control District, Sierra RCD, PG&E, ditch companies, Friends of the Kings River, Kings River Conservation District, Kings River Conservancy, Kings River Water Association/Users, Upper Kings River Forum (IRWMP), National Park Service – wilderness headwaters of Kings Canyon National Park, and Sierra National Forest.

Existing water management planning includes the Forest Management Plans of Sierra and Sequoia National Forests, Sequoia and Kings Canyon National Parks General Management Plans, and Fresno County's general plans.

Sierra RCD's work on a groundwater management plan for eastern Fresno County, the Upper Kings River Forum's IRWM planning, and the Kings River Conservancy's watershed protection and planning are the on-going public involvement processes in the Kings River Watershed.

The Pacific Southwest Research Station's Kings River Experimental Watersheds and National Science Foundation's (NSF) Southern Sierra Critical Zone Observatory (SSCZO), the Kings River Conservation District, and Fresno State University all have been conducting studies and research in the Kings River Watershed. The projects and facilitating organizations are: Fresno State's graduate research on aquatic species and the effect of riparian areas on water quality, the USFS's Pacific Southwest Research Station's watershed management and stream water quality and quantity assessment, and the Sierra Nevada Conservancy.

There are several watershed issues including water quality degradation after fires, downstream flooding, wildlife connectivity, groundwater availability, quality and management, well water quantities, county zoning, land use and water quality, and invasive species.

Kaweah River Watershed

This watershed has limited capacity to enhance the water management portfolio. Managing entities in the Kaweah River Watershed include the US Army Corps of Engineers, Kaweah Delta Water Conservation District, Tulare County Resource Conservation District, Southern California Edison, ditch companies, Alta Acres Water Association, Three Rivers Community Services District, Sequoia and Kings Canyon National Parks, Sequoia National Forest, and the Bureau of Land Management.

Existing water management planning in the Kaweah River Watershed includes the Forest Management Plan of Sequoia National Forest, Sequoia and Kings Canyon National Parks General Management Plan, BLM Caliente Area Management Plan, and the Tulare County General Plan.

Collaboration and public involvement activities include Sequoia and Kings Canyon National Parks NEPA processes and symposia, the BLM – Caliente management plan, Tulare County DAC pilot study, and the Sierra Nevada Conservancy's regional analysis, public symposia, and meetings.

There are many data collection and sharing activities in the Kaweah Watershed. These include the Southern Sierra Partnership, the Sequoia Riverlands Trust's land protection planning, well water monitoring, and watershed impacts of grazing. Other projects include the National Park Service's frog restoration via trout removal in high elevation lakes, and the Cahoon Meadow Restoration Planning Project, Tulare County's Three Rivers Community plan, Flyfishers for Conservation's Big Meadows Restoration Project's groundwater and bug data monitoring, and the Southern Sierra Partnership's climate change adaptation program.

Ongoing projects in this watershed include surface water monitoring by Three Rivers CSD, the Halstead Meadow Restoration Project, the Velvetgrass Removal Project in Sequoia National Park and Sequoia National Forest, and Three Rivers CSD's small water system, which monitors groundwater and Sequoia Riverlands Trust's ecological restoration of an abandoned rock quarry in Dry Creek.

Watershed issues in the Kaweah Watershed include flooding downstream during high water events, fuel buildup and catastrophic fire, wildlife connectivity, ground and surface water availability, quality and management, wells in floodplains dewatering streams, invasive species, leaky infrastructure, changing land use impacts on water quality, quantity.

Tule River Watershed

This watershed has moderate capacity to enhance its water management portfolio. Managing entities in the Tule River Watershed include the US Army Corps of Engineers, Cal Fire, Southern California Edison, Tulare County RCD, Ditch Companies, Springville PUD, Sequoia National Forest, and the Tule River Indian Reservation.

Watershed issues for Tule River include downstream flooding, marijuana cultivation, littering along waterways, wildfire, wildlife connectivity, groundwater and surface water availability, quality and management, a moratorium on new hookups for the Springville Public Utilities District, water supply for Tule Indian Reservation, invasive species, leaky water management infrastructure, in-stream flow, and land use and water quality and quantity.

Existing water management planning includes the Forest Management Plan of Sequoia National Forest, and Tulare County's General Plan. Examples of collaboration and public involvement include Sequoia National Forest's NEPA processes, and Tulare County's General Plan.

An example of data collection and sharing in this watershed is the climate change adaptation and ecosystem services work being completed by the Southern Sierra Partnership.

Ongoing projects in this watershed include Southern California Edison's Tule Flume Replacement Project, partnerships among Wild Places, USFS, and CSET to monitor river areas and clean up trash, an education program with language interpreters about litter clean up and stewardship of river resources, marijuana eradication on Tule River Indian Reservation, and the Long Meadow Restoration Planning Project. Ongoing studies in this watershed include the Forest Service's streams and water yield research.

Deer Creek Watershed

This watershed has very limited capacity to enhance its water management portfolio. Managing entities in this watershed include Tulare County RCD, PG&E, Sequoia National Forest, and Deer Creek Hydroelectric.

Existing water management planning in this watershed includes Sequoia National Forest's Forest Management Plan and Tulare County's General Plan. The National Park Service is conducting a western pond turtle study throughout the southern Sierra, including some private ranches on Deer Creek.

Collaboration/public involvement activities include the Tulare County General Plan. Data collection and sharing activities include: The Southern Sierra Partnership's work on climate change adaptation and ecosystem services, the Forest Service's stream conditions

inventory, and the Regional Water Quality Control Board's sampling for impaired water bodies.

Ongoing projects include restoration along Deer Creek at the Moure Preserve, and restoration, invasive species removal, and riparian fencing along Tyler Creek.

Watershed issues in Deer Creek Watershed include downstream flooding during high water events, impaired water body listing, wildfire threats, wildlife connectivity, grazing management along stream courses, groundwater availability, quality, and management, land use and water quality.

White River Watershed

This watershed has very low capacity to enhance its water management portfolio. Managing entities in the White River Watershed include Tulare County RCD, Southern California Edison, ditch companies and US Forest Service.

Existing water management planning in this watershed includes Sequoia National Forest's Forest Management Plan, and the Tulare County General Plan. Collaboration and public involvement activities include individual USFS NEPA processes, BLM – Caliente Management Plan, and the Tulare County General Plan.

Data collection and sharing activities include the Southern Sierra Partnership's climate change adaptation and ecosystem services work and Sequoia National Forest's stream condition inventory.

Poso Creek Watershed

Capacity to enhance the water management portfolio is very limited in the Poso Creek Watershed. Managing entities in this watershed include the Poso Creek IRWMP, Kern County Water Agency, Tulare County RCD, Southern California Edison, and the Sugarloaf Mutual Water Company.

Existing water management planning in this watershed includes Sequoia National Forest's Forest Management Plan and the Tulare County General Plan.

Collaboration/public involvement activities include USFS NEPA processes, BLM – Caliente Management Plan, and the Tulare County General Plan.

Data collection and sharing activities include the Southern Sierra Partnership's climate change adaptation and ecosystem services work and Sequoia National Forest's stream condition inventory.

Watershed issues include downstream flooding, wildfire, wildlife connectivity, groundwater availability, quality and management, changing land use impacts on water quality and quantity.

Kern River Watershed

Capacity in the Kern River Watershed to diversify its water management portfolio is moderate. Managing entities in the watershed include the US Army Corps of Engineers, California Audubon Society, Desert and Mountain RC&DC, California Department of Fish and Game, Tehachapi RCD, PG&E, Cal Water, ditch companies, water districts, Kern County Water Agency, and Native American Tribes. The SSIRWMP Region and the Kern County Water Agency Region collaborate to co-manage the watershed.

Watershed issues include:

- Flooding downstream after disturbance such as wildfire;
- Reduced water quality because of recreation impacts;
- Kern River - impaired water body;
- Three species of endangered trout;
- Wildlife connectivity;
- Groundwater availability, quality, and management;
- Land use impacts on water quality, quantity, and native species.

On-going work for the Kern River Watershed includes:

- Existing water management planning includes the Sequoia National Forest's Forest Management Plan, Tulare and Kern counties general plan, and California Department of Fish and Wildlife's Fishery Management Plan.
- Collaboration/public involvement activities include Kern County Water Agency's IRWMP effort, Sequoia and Kings Canyon National Parks General Management Plan and other NEPA processes, USFS NEPA processes, BLM – Caliente Management Plan, Tulare County's General Plan, and the Upper Kern Recreation Management plan.

Data collection and sharing activities include:

- The Southern Sierra Partnership's climate change adaptation and ecosystem services work;
- Sequoia National Forest's stream inventory assessment and watershed yield work;
- Collecting water quality samples in the Upper Kern Watershed by watershed Coordinator.

Studies and research activities include USFS recreation planning, water quality sampling, and fishery management for golden trout.

Ongoing projects include the Upper Kern River recreation management study and the Kern River Fishery Management Program.

2.3 Man-made facilities

There are significant man-made water resource facilities within the IRWM area that export water to other (downstream) areas for consumption, flood control, recreation and wildlife habitat. The San Joaquin River at Friant Dam is diverted for irrigation via the Friant-Kern Canal south as far as Kern County. Southern California Edison operates Edison, Florence, Huntington, Shaver and Redinger Lakes in the San Joaquin River watershed. Also in the San Joaquin watershed is the Mammoth Pool reservoir operated by Pacific Gas and Electric (PG&E). PG&E also operates two large, high elevation reservoirs in the Kings River Drainage: Courtwright and Wishon. The US Army Corps of Engineers operates the Pine Flat Dam in the foothills of Fresno County. The Army Corps of Engineers also operates dams on the Kaweah, Tule and Kern Rivers.

2.4 Water Demand

Water demand in the SSIRWM region is of concern because, at present, all of the rivers are fully appropriated and additional demand will potentially create conflicts or shortages. This is according to the State of California Water Resources Control Board, Water Right Order 98-08.[1] This includes the portions of the following rivers that are within the SSIRWM boundary: Kings, Tule, San Joaquin, Middle Fork Kings, South Fork Kings, North Fork Kern, Poso Creek, and Kern, main and South Fork .

Historical water production

Agricultural water use in the Southern Sierra consists primarily of stockwater ponds and irrigated pastures. Very little area in each drainage is dedicated to irrigated agriculture. The use of water for agricultural purposes in the Region has not changed much in the last 100 years. It is very difficult to determine the historical agriculture use and production because there are very few records, the use was spread over great area and left little evidence in the landscape.

Urban and rural nonagricultural water use in the southern Sierra consists of small towns and individual landowners who irrigate lawns, landscaping and use water for urban consumption. Urban and rural water use has increased over the last 100 years because of

[1] State of California Water Resources Control Board. (1998). *Order Revising Declaration of Fully Appropriated Stream Systems* (No. WR 98-08).

population growth and associated landscaping and water-intensive appliances and facilities.

Historically, the Region had little water production for local residents and while this trend continues, increasing development in the foothills creates higher local demand. The waters that flow from the region late in the season as snowpack and the 2,605,600 acre-feet of water stored in the Region serve downstream interests.

Water demand projections

Increasing populations in the existing towns in the Region, new towns and greater visitation mean increasing demand for water resources. Because most towns and residents use groundwater, it is important to understand the sustainable use rate of the aquifers in the each individual location.

Because the Region's surface waters are fully appropriated, additional supplies for local residents and downstream users will only come from willing water right holders who may be able to negotiate other water uses to lease, easement or purchase their rights.

The impacts from climate change may place further demand on water resources in the southern Sierra. If temperatures and evapo-transpiration rates rise, soils and local aquifers will become drier, creating vulnerability in the supply because of evaporation and increased demand. If higher temperatures cause erratic precipitation, increasing flooding, and runoff, less water might be stored in the groundwater.

2.5 Water Supply

Existing groundwater supply

The Southern Sierra Regional Water Management Group (SSRWMG) recognizes that within this Region, groundwater resources are scarce, little is known about the long-term reliability of this source. Fractured bedrock aquifers can also be subject to water quality problems and quantities are largely unknown. There are limited opportunities for water resource movement across landscapes due to the deeply incised canyons of the upper watersheds. Thus, some traditional water management options identified in Bulletin 160-05, such as water transfers and conjunctive use projects, are not as possible or likely within the boundaries of this Region. The RWMG understands some of the water agencies that provide major water supplies to the SSIRWM region have no water rights, but rather depend on contract customers. Large landowners however, many of whom own pre-1914 rights, are an important group of water managers who also have a number of options regarding water management. These options include water rights transfers, leases or contracts, easements, and in-stream uses.

Existing surface water supply

A few water purveyors, such as Springville Public Utility District and Three Rivers Community Services District and many local ditch companies, rely primarily upon surface water that is delivered by a combination of open ditches, flumes, and pipes. Local water agencies continue to evaluate improved methods to conserve water while preserving the rural and historic characteristics of their raw water delivery systems. Extensive end user water conservation efforts have also been implemented over the years.

Additionally, there are limited opportunities for new surface water developments due to the number of existing facilities and senior water rights holders. All of these are significant factors that will likely emerge in future IRWM planning process.

2.6 Comparison of Water Supply and Demand

Because all rivers are fully appropriated, increasing water supply is a challenge. There is no available water with which to reliably increase supply, except if water right lease or contract enables water to remain in-stream or to be used downstream. Residents are drawing groundwater, largely from fractured rock aquifers with unknown quantities and impacts. Fractured bedrock aquifers are finite in quantity and replenishment is unpredictable and little is known about the nature of the supply. As water demand increases with an increasing population, supply to meet this increased demand will become difficult to accommodate. The region's water supports over 1.6 million visitors per year in addition to the over thirty thousand residents in the SSIRWM Region. Visitors are a great economic resource to the region, but add significant seasonal demands to the local fractured bedrock groundwater supply that must also support the region's permanent residents. Very little groundwater information is available and accessible for resource planning in the region where fractured bedrock aquifers serve remote, disadvantaged communities through individual wells and septic tanks. The SSIRWM Region has no incorporated cities, only a few, small water treatment plants, and the majority of the region utilizes wells and septic tanks. County general plans call for development in foothill and mountain communities; however, sustainable use rates have yet to be established for existing communities who rely almost exclusively on fractured-rock aquifers. The region is supported by a small number of public districts, including Three Rivers Community Services District, Springville Public Utilities District, several small water associations, many private ditch companies, two resource conservation districts, and two resource conservation and development councils.

2.7 Water Quality

The Southern Sierra RWMG has identified several issues that relate to water quality in the IRWM region. These include:

- Several areas in the Region or adjacent have drinking water that does not meet California and national standards;
- Water treatment systems do not meet standards, or have very limited capacity;
- Sediment buildup in storage facilities;
- Agricultural runoff;
- Post-fire sediment;
- Groundwater pollution;
- Septic systems are not updated, serviced or monitored to meet standards;
- High atmospheric nitrogen deposition has potential to cause water nitrogen increases and acidification;
- Impacts from recreation.

Improving water quality in the SSIRWM region is one of the primary goals of the IRWMP. In a 2009 report commissioned by the California Environmental Protection Agency and the Central Valley Regional Water Quality Control Board,[2] water bodies included, at least in part in the Southern Sierra IRWM Region, were listed with some impairment to water quality (Table 1). Projects with water quality improvement goals are given priority in the SSIRWMP.

For 303(d), State and Regional Water Boards assess water quality monitoring data for California's surface waters every two years to determine if they contain pollutants at levels that exceed protective water quality standards. Water body and pollutants that exceed protective water quality standards are placed on the State's 303(d) List. For several reaches of the rivers, the source of the contamination is unknown or the contamination is unknown. This determination in California is governed by the Water Quality Control Policy for developing California's Clean Water Act Section 303(d) List. U.S.EPA must approve the 303(d) List before it is considered final.

Placement of a water body and pollutant that exceeds protective water quality standards on the 303(d) List (see Table 1 below), initiates the development of a Total Maximum Daily Load (TMDL).

Deer Creek's listing, for example, prompts the Regional Water Quality Control Board to seek improvements along this river in order to remove the water body from the list.

2.8 Social and Cultural Makeup of the SSIRWMP Region

[2] Impaired Waters List, Appendix A, Proposed Changes to the 303(d) list. California Environmental Protection Agency and Central Valley Water Quality Control Board. September 2009. Unpublshed.

Like many areas rich in natural resources, the SSIRWM Region consists of small, low-income communities with no incorporated cities. The counties, which share portions of this region (primarily Fresno and Tulare), extend from the mountains down into the fruitful Central Valley and tend to focus their scarce planning resources on the higher population agricultural areas. Although there are State and Federal agencies involved in land management, none of these agencies have the resources to engage in comprehensive regional planning. Historically, very limited state and/or federal financial resources have been dedicated to this region.

Table 1. Impaired water bodies in the SSIRWM Region.

Waterbody Segment	Pollutant
Cross Creek	Unknown Toxicity
Deer Creek (Tulare County)	High pH
	Unknown Toxicity
Elk Bayou (Tulare County)	Chlorpyrifos
	Dimethoate
	High pH
	Unknown Toxicity
Fresno River	Low Dissolved Oxygen
Hume Lake*	Oxygen, Dissolved
Isabella Lake*	Oxygen, Dissolved
	pH
Kaweah Lake*	Mercury
Kaweah River*	pH
	Unknown Toxicity
Kings River	Unknown Toxicity
Mill Creek (Tulare County)	Unknown Toxicity
Millerton Lake*	Mercury
Poso Slough	Sediment Toxicity
Success Lake*	pH

*These rivers and water bodies lie within or immediately adjacent to the SSIRWM Region boundaries. Other bodies listed have their upper watersheds in the SSIRWM boundary.

In larger urban areas, Disadvantaged Communities (DAC) are islands of poverty surrounded by a sea of relative wealth, while in the Southern Sierra there are very small

islands of relative wealth surrounded by a sea of areas that qualify as DACs. Additionally, unlike valley farm communities and urban low income areas, there is rarely a central or even identifiable point of contact to reach DAC populations. This makes communication, coordination and meaningful interaction very labor intensive.

Therefore, effectively engaging DACs and incorporating their input is very costly to IRWM programs that service those large, decentralized DAC areas. This additional cost, a pre-existing lack of existing community capacity, and the grant requirement for a local match, place an extraordinary and unreasonable burden on many IRWM programs in the Sierra. In short, some can't afford to compete with their downstream, more affluent regions that are unfortunately in the same funding region.

Placing water management into a context that considers ecological, social, economic and cultural components has been a priority for the SSRWMG. In early meetings, brainstorming sessions were held between stakeholders that identified primary issues and effects on Disadvantaged Communities (DAC). Some of the primary issues from a social standpoint are pollutants in drinking water, affordability of municipal and private water, substandard water systems in unincorporated communities, tribal water rights, and various cultural water uses and needs.

These issues will remain a concern of the SSRWMG and projects that address these needs will be given special consideration. When the social, economic, and cultural context of water is considered, the supply and demand debate is magnified. Distributing limited resources cannot just be established by market means. Cost, accessibility, and affordability for all users must also be a factor. This will ensure that the people in the SSIRWM region who have limited access to clean, fresh water will continue to be able to receive it.

The counties which constitute almost all of the Southern Sierra IRWM area (Fresno and Tulare) include both valley and foothill/mountain areas within their boundaries. Their major population centers are located in the valley areas. The population in the foothill/mountain regions are scattered throughout a large area and are difficult to serve. These two counties are poor and have limited resources. Their cities and towns on the valley floor have many needs and are easier to serve than the somewhat less populous communities in the foothills. Consequently these more remote communities have received few services and resources.

The communities in the Southern Sierra IRWM area consist of approximately 17 small towns (population 1,500 or less), none of which are incorporated. Approximately half of these meet the definition of disadvantaged communities, (MHI<$37,994)[3] as follows[4]:

Error! Not a valid bookmark self-reference. Disadvantaged communities are marked with an asterisk*.

Town	Zip Code	MHI	Town	Zip Code	MHI
Shaver Lake	93664	$42,167	Squaw Valley*	93646	$23,280
Auberry	93602	$42,885	Pinehurst*	93641	$30,357
Lakeshore	93634	$45417	Badger*	93603	$21,838
Prather	93651	$41,341	Three Rivers	93271	$44,432
Toll House	93667	$50,227	Pineridge	93602	$42,885
Miramonte*	93641	$30,357	Posey*	93260	$28,929
Dunlap*	93621	$17,063	White River*	93207	$22,188
Springville*	93265	$35,101	Kernville*	93238	$27,955
			Johnsondale*	93208	$36,607

Tribes

There are also three federally recognized Indian Tribal Reservations or Rancherias in the region: Big Sandy (MHI 19,250), Cold Springs (MHI 35,000) and Tule River (MHI 30,625), all of which meet the DAC criteria. The towns listed above which do not meet the DAC criteria are areas where the tourism industry brings in more money and attracts higher income residents and may be based on averages skewed by second home owners and commuters working in cities in the Valley. But historically the populated areas were built around extraction or agricultural industries (mining, cattle and logging) and suffer from low income and poor infrastructure conditions. They are also generally isolated and

[3] In rural areas it is more accurate to use the 2000 Census figures rather than the Dept. of Finance estimates. This is because these estimates are not done on a small enough geographic area to capture the true income of a community. Springville 2005-2009 data source is American Community Survey.

[4] In order to get more of a picture of the communities themselves, we have listed MHI by the communities' zip codes. In rural areas, zip codes tend to be more accurate than block groups for this purpose because they follow community boundaries more accurately. Many times communities are separated into multiple block groups which, because of the low population density, also include wealthier areas in nearby cities.

remote. This has made it a challenge to engage the residents in the IRWM process. The SSIRWM has made consistent efforts to overcome these challenges, but has met with only limited success to date. Based on this the IRWMP planning process included significant tasks and resources to improve the involvement of these disadvantaged communities.

The initial outreach efforts by the Sierra Nevada Alliance and Sequoia Riverlands Trust included identifying stakeholders in these disadvantaged communities. Staff put together a list of Tribal representatives, Community Service Districts, Village Foundations, Resource Conservation Districts and nonprofit organizations which served the communities. Continuing efforts have been made to add to this list. In addition, the SSIRWM project manager arranged meetings with the Community Water Center and Self Help Enterprises, two nonprofit organizations which provide infrastructure assistance to disadvantaged communities in the larger region. Both of these entities acknowledged the needs of these communities and both stated that they did not have the resources to serve them – all of their resources are currently directed at the needy Valley communities. They also gave their support to the SSIRWM effort to include these DACs in their process and direct resources toward their needs.

There have been a few representatives of these DACs who have attended the IRWM Planning Committee meetings, including representatives from Springville and the Tule River Indian Tribe to represent tribal interests. In an effort to better reach the non-participating communities, SSIRWM representatives have conducted some direct outreach, but the resources for this were limited and presentations were only made in three of the DAC towns. The most effective strategy with our limited resources was to contact organizations that represented several of these communities. Meetings were held with the Community Water Center, Self-Help Enterprises, Sierra RCD, the Tulare County RCD, and the Tulare County Public Health department to try to understand the needs of these disadvantaged communities. The SSIRMWP has also sought additional grant funding to do better direct outreach and to provide travel stipends to DAC representatives, but to date these grant applications have not been successful.

Based on the direct experience of the difficulties in serving the region's DACs, the RWMG has dedicated significant resources to improve DAC participation, including:

- Outreach meetings in DAC areas;
- Travel/participation stipends for DAC representatives to attend meetings and workshops;
- Resources to assist the DACs in establishing watershed committees - a sustainable way to promote public education and community involvement in natural resources planning and projects.

The RWMG will need to continue to reach out and engage DACs in planning and implementation to ensure the DAC needs continue to be represented.

2.9 Major Water Related Objectives, Issues, and Conflicts

The SSIRWMP focuses on the integration of water management activities including (but not limited to) watershed related stewardship projects, man-made facilities, water quality, flood and fire hazard mitigation, equal accessibility, and water supply and demand. By having a large geographic area, the SSIRWMP includes a large number of these natural and man-made resources which can encourage the coordination of planning and management among numerous stakeholders. This is balanced by the need for reasonable access to meetings, as well as the desires of the area stakeholders.

Water management issues for the region are broad and include water supply, water quality, flood management, environmental stewardship, water transfers, and infrastructure development. There are also social, economic, and cultural implications of water conflicts; successful projects and implementation will take into account this variety of inter-related challenges.

Many IRWM Planning Committee agencies and interest groups have participated in complex resource management programs and processes including but not limited to: Forest Land and Resource Management Plans, City and County General Plans, Federal Energy Regulatory Commission hydroelectric license processes, California Environmental Quality Act preparation and review, National Environmental Policy Act review and other administrative actions. The Southern Sierra IRWMP public meetings have identified some preliminary water management issues for the region:

- Competing demands - Agricultural vs. development;
- Blocked fish passage from man-made and natural obstacles;
- Upstream and downstream conflicts over pre-1914 water rights;
- Forest management and water yield;
- The need to provide clean, sustainable and affordable water supply for the populations of the IRWM Program area;
- The presence of water rights holders whose customers are located outside of the Program area and its watersheds;
- Inadequate knowledge of flooding risks, hazard areas and landslide dam flood risk;
- Land use in the foothills – urbanization and development moving up from the valley relying heavily on groundwater. The foothill and mountain communities in the SSIRWMP area are expected to continue to grow as provided for within the land use agency plans, which will provide additional stress on the environment and water supplies.

There are a number of areas where insufficient hydrological information about the locations of fissures, cracks and faults and amounts of water contained in them creates water conflicts among and between users.

SSRWMG Values

There are several areas of commonality of interests among members of the Regional Water Management Group/Planning Committee.

The following are values for the region:

- Stakeholder and public input to natural resource decision-making;
- Consensus-based decision making;
- Inclusiveness and transparency;
- Science as a basis for decision-making and natural resource management;
- Respect for private property rights;
- Respect for the public trust;
- Equity and fairness in resolution of water conflicts and in developing mutually beneficial approaches and results;
- Integration of management entities, strategies and benefits;
- Coordination with adjacent regions;
- Sharing of data, information and knowledge in a variety of ways to meet the needs of the stakeholders and the public at large.

Collaboration among stakeholders will be required to successfully address the Region's issues, implement the strategies to fulfill the regional objectives.

2.10 Neighboring and/or Overlapping IRWM efforts

The Southern Sierra IRWM region is bordered by several IRWMP and other water management efforts (described below). North of the Southern Sierra IRWM Region is the Madera IRWMP and to the East is the Inyo-Mono effort. The Madera IRWMP already has a plan based on County boundaries and is ready to begin implementing projects. The Madera IRWMP covered a small portion of the San Joaquin River Watershed, which is also included in the Southern Sierra Region. Upon analysis of the Madera Plan, the SSIRWMP Planning Committee determined that the issues emerging from the SSIRWMP Planning Committee meetings were different from the Madera IRWM Plan and that 'joint management' of the overlap area would be a feasible solution. The SSIRWM Planning Committee initiated discussions with Madera County to approve the joint management of this overlap area. An initial conceptual agreement and a draft MOU (see Appendix I) regarding the overlap were drafted and presented to the Madera Water Advisory Commission and the County Board of Supervisors. This conceptual agreement was considered, and the Madera Water Advisory Commission appointed a member to be a liaison to the SSIRWM Planning Committee.

Unfortunately, these early negotiations didn't prevent Madera from exploring other boundary options, such as including the entire San Joaquin River watershed.

Subsequent to these actions, the Madera IRWMP and the forming Mariposa County IRWMP began negotiations about a potential merger to create a region that included the entire San Joaquin River Watershed. On April 6, 2009, the Sierra Nevada Conservancy facilitated a meeting between the affected IRWMP regions, with DWR attending. A tentative agreement was reached among the parties about regional boundaries and collaboration. Since the DWR representative discouraged the existing overlap proposal and representatives from the Madera IRWMP wished to remain active in the San Joaquin River Watershed, it was agreed to consider a potential combination of efforts of the Madera IRWMP and the Mariposa County IRWMP. In this case, the combined boundary would follow the San Joaquin River itself with the combined northern effort to the north of the river, while SSIRWMP would remain active south of the river in the SJRW. The agreement between the Mariposa County effort and the Madera effort has not yet been finalized as of this writing, however the SSIRWMP has taken the position that it will follow this guidance and use the San Joaquin River as the boundary. The only exception to this is a small portion of the upper San Joaquin River Watershed which is outside of Madera County, and which is not included in the Madera IRWMP region. In order to avoid a gap in coverage, the RWMG agreed to include this small area in their region. Madera expressed future desire to work collaboratively in the watershed.

2.11 History of IRWM Efforts in the Region

Prior to this effort, the Southern Sierra region has had no history of IRWM planning. The Southern Sierra Integrated Regional Water Management Plan (SSIRWMP) was initiated through the actions of the Sequoia Riverlands Trust, the Sierra Nevada Alliance and the Sierra Nevada Conservancy based on their respective concerns that the region was missing out on essential planning and management resources. With funds from a Sierra Nevada Conservancy 'launch' grant, an initial organizational meeting was held on May 21st, 2008. This meeting involved public agencies, non-profits and interested stakeholders that became the Regional Water Management Group. Following this initial meeting, the IRWM participants began aggressive public outreach and held monthly meetings. Outreach was conducted to numerous interest groups, federal, state and local agencies as well as non-governmental organizations. Of course, the lack of specific IRWM planning efforts in the region does not mean planning has not taken place, however it has been done individually by agencies with responsibility over the region. Over the course of the planning work 2008-2012, the RWMG and project staff have compiled a list of current water-related plans and studies for the area and worked with various stakeholders to identify goals, objectives and specific projects that should be part of an IRWMP. This is truly the first 'integrated' planning effort that has taken place for the region.

2.12 Regional Boundaries

The SSRIWMP region boundaries are described as follows and represented by the map in Figure 1:

- To the east, the Southern Sierra IRWMP boundary is defined by the Sierra Nevada crest.
    - Rationale: Waters flowing to the west from the Sierra crest are source waters for foothill uses and management. Precipitation falling west of the crest drains the western slope of the mountain range and is connected hydrologically with the Tulare and San Joaquin basins.
- To the north, the Southern Sierra IRWMP is defined by the upper San Joaquin watershed.
    - Rationale: The upper San Joaquin River Basin is split between Fresno and Madera Counties, but the river is managed across counties. The issues on either side of the county line are similar, but contrast sharply with downstream users in intensive agricultural areas outside of the Sierra Nevada region. The San Joaquin watershed shares many of the same issues with watersheds further south in the region.
- To the west, the Southern Sierra IRWMP boundary including the foothill areas of the region's watersheds.
    - In the Kings River area, the SSIRWMP boundary extends the District boundaries of the Tri Valley, Orange Cove, and Hills Valley Water Districts east of the towns of Orange Cove, Orosi, and East Orosi. East of the city of Fresno, the boundary extends to the boundaries of the Fresno Metropolitan Flood Control District, the International Water District, and the Garfield Water District.
        - Rationale: This boundary was negotiated with the Upper Kings River Forum Regional Water Management Group to match UKRF boundaries.
    - In the Kaweah Delta area, the SSIRWMP boundary extends to the Kaweah reservoir or the 600-foot contour in the Kaweah River Drainage. Further, the boundary follows the RWQCB irrigated lands program and generally follows surface water-ground water usage boundaries. In the aquaculture/Lewis/Avocado area, the boundary will be the 600' elevation contour and squared to section lines; the agriculture north of Elderwood will be in the KDRWMP.
        - In Davis Valley, the Westside has small, irrigated lands while the east and the north are rangeland. The boundary will follow section lines in these areas.

        - In Dry Creek, the boundary will follow land use: irrigated lands will be part of the KDWMG and grazing land will be in the SSIRWMP.
        - In Mehrten Valley, the 600' contour will be the guide, most of the valley will be in KDRWMG.
        - In Yokohl Valley, most of the western valley will be in the KDRWMG while the eastern portion of the valley will be in the SSIRWMP.
        - In Round Valley, east of Lindsay, the KDRWMG will include a few small areas east of the Integrated Lands Program (ILP), the boundary will again be based on land use and squared to the section lines.
            - Rationale: This boundary was negotiated with the Kaweah Delta Water Conservation District Regional Water Management Group to match KDWCD boundaries.
    - In the Tule River Area, the SSIRWMP boundary includes the Tule River Indian Reservation and down to approximately the 600-foot contour in all forks of the Tule and squared to section lines. The Deer Creek Tule River Authority planning area will follow irrigated lands while the SSIRWMP will follow rangeland.
        - Rationale: This boundary was negotiated with the Deer Creek-Tule River Authority Regional Water Management Group to match that region's planning boundaries.
- To the south, the Southern Sierra IRWMP boundary is defined by the Tulare-Kern County line.
    - Rationale: The Kern watershed's water resources will be managed by both SSIRWMP and Kern County Water Agency IRWMP. The two entities will work collaboratively in the watershed across the county boundary.

During planning activities beginning in mid-2013, the planning firm who will write the next update of the plan will collect and summarize additional existing information about the region. Based on existing information, the planning firm will update the regional description including: watersheds and water systems; internal boundaries; water supplies and demands until 2050; water quality conditions; social and cultural makeup; major water related objectives and conflicts; IRWM regional boundary; and neighboring and/or overlapping IRWM efforts.

Chapter 3 - Governance

3.1 RWMG Governance Structure

Governance is an integral part when creating an Integrated Regional Water Management Program. The Southern Sierra developed a strong government structure that allowed for a variety of stakeholders in the region, along with disadvantaged communities, to communicate and integrate activities, goals and agency issues and priorities during the development of this plan. Creating a consensus-based governance structure utilizes the strength of the community in decision-making and provides a forum for all interested stakeholders, helping to ensure the success of the developed plan.

3.2 Background – How Governance Structure Was Developed

The Southern Sierra Integrated Regional Water Management Planning effort (SSIRWMP) was initiated through the actions of the Sequoia Riverlands Trust, Sierra Nevada Alliance, and the Sierra Nevada Conservancy. The Sierra Nevada Conservancy provided a grant to fund a launch phase of the planning process to identify stakeholders, hold public meetings and write a grant to the California Department of Water Resources. The Sequoia Riverlands Trust accepted the role of grantee and worked with the Sierra Nevada Alliance to identify stakeholders and organize the first meeting of stakeholders interested in an IRWM Program.

The objective of the IRWMP early on was to establish a group that could make necessary organizational decisions such as: identify and approve IRWMP boundaries, construct and approve a governance structure and function, identify and acquire funding mechanisms, and a public participation process. This group eventually worked, through a consensus based process, to adopt a governance structure (see Southern Sierra Integrated Regional Water Management Program Governance Principles, attached as Appendix III), a Memorandum of Understanding (MOU, see attached as Appendix I).

Since its initial session, this group has met regularly, except for a three month break during the state financial crisis at the Tulare County Farm Bureau office in Visalia, California. All participants encourage public involvement, and all the meetings have been open to the public. All attendees were allowed to participate in discussions. Meeting notes are published on the Sequoia Riverlands Trust's website (www.sequoiariverlands.org/news.html).

3.3 Governance Structure Overview

While the legal entity in the IRWMP is the RWMG, the Planning Committee is the decision-making body of the SSIRWMP process. In that context it will oversee and approve major

programmatic decisions such as funding applications and performance measures. The Planning Committee will set the overall strategic direction for formation of the IRWMP. It oversees the program, directs actions by support staff and consultants, and provides leadership to the program. Any qualifying entity which signs the MOU (see Appendix I) can become an Official Member of the Planning Committee.

The Southern Sierra RWMG effort consists of a large group of stakeholders represented by 20-30 organizations in the Planning Committee, which meets regularly for planning meetings. The Planning Committee strives to ensure its membership represents a broad range of interests, including: water supply, water quality, environment/habitat, recreation, agriculture and ranching, resource management, hydropower, cities/counties, sanitation, other water resource management areas, economically disadvantaged local communities and individual local stakeholders interested and willing to participate. The following entities signed the MOU:

- Sequoia Riverlands Trust
- California Department of Fish and Wildlife
- Sierra Resource Conservation District
- United States Forest Service, Sequoia National Forest
- National Park Service, Sequoia National Park
- Three Rivers Community Services District
- Yosemite/Sequoia Resource Conservation and Development Council
- Revive the San Joaquin
- Desert and Mountain RC&D
- Sierra and Foothill Citizen's Alliance
- San Joaquin Valley Water Leadership Forum
- Springville Public Utilities District
- Tulare Basin Wildlife Partners
- Fresno Metropolitan Flood Control District
- Sierra Club – Tehipite Chapter.

3.4 Coordinating Committee

The Coordinating Committee, appointed by the Planning
Committee, is a smaller, representative group of the Planning Committee that meets between Planning Committee meetings to assist staff with process planning, recommendations for process modifications, communications, and other issues for which staff needs advice. The Coordinating Committee may also provide more consistent fiscal oversight in helping to manage the IRWMP with the fiscal sponsor. The Coordinating Committee may play a role in developing substantive proposals and policy, at the request

and subject to the approval of the Planning Committee, but has no decision-making authority.

Regional Water Management Group: The Regional Water Management Group (RWMG) consists of the Planning Committee members which meet the statutory requirements for inclusion in an official RWMG. In the case of the SSIRWMP, the RWMG has no independent decision-making authority but follows the directives of the Planning Committee.

3.5 Decision Making

The members of the Planning Committee serve as the consensus based decision-making body for the Program. According to the agreed upon Principals of Governance, there is no traditional "voting" process. The Planning Committee strives for consensus (agreement among all participants) in all of its decision-making. Working toward consensus is a fundamental principle of the Southern Sierra IRWM Program process.

In reaching consensus, some Planning Committee members may strongly endorse a particular proposal, while others may accept it as just "workable." Others may be only able to "live with it." Still others may choose to "stand aside" by verbally noting a disagreement, yet allowing the group to reach a consensus without them if the decision does not affect them or compromise their interests. Any of these actions still constitutes consensus.

Issues for decision are brought to the Planning Committee by any Committee member or by the project staff. They must be included on a meeting agenda (through contact with the Project Manager) in order to be considered as an 'action item'. The consensus process is facilitated by the Facilitator, and the conclusions reached are clearly specified for inclusion in meeting minutes.

3.6 How the RWMG and other Governance Entities will Incorporate New Members

The IRWM Program makes consistent efforts to include more interest groups and the public in this process (see Appendix E, Program email notification list). Additionally, meeting agendas and minutes are circulated to a broad and inclusive group of interests. These include local agencies with facilities within the region, public utilities, federal agencies, state agencies, local tribal interests, business groups, etc. The agenda and notice of the IRWM monthly meeting is posted on the SRT web page (www.sequoiariverlands.org) as well as in the SRT office approximately 5 to 6 days in advance of the monthly meetings.

An important priority since the inception of the IRWM Program has been to provide an open forum for participation in an inclusive structure. SRT, as the managing agency, used lists of interested parties from past water resource related matters, as well as recommendations from other agencies, the public, and NGOs, to solicit interest. Every

attempt was made to facilitate stakeholder participation. Planning Committee membership remains open to any additional stakeholders who wish to join by executing the MOU and complying with its terms and conditions.

Those participants that have executed the MOU are members of the Planning Committee and, if consistently active in the process, they may participate in the consensus-based governance of the Program. Other parties who attend meetings are also allowed to participate in general discussions and decisions.

3.7 How Governance Structure Will Facilitate Development of a Single Collaborative Water Management Portfolio

The Southern Sierra IRWM Program is very new. The current focus has been on building a strong basis in shared agreement over governance, goals and issues. The MOU, signed by all Planning Committee members, includes a commitment that "The Parties will support the process and tasks necessary to develop and submit a Proposition 84 IRWMP Planning Grant with the intention to ultimately work cooperatively on the development of a Southern Sierra IRWMP Plan as shown on Appendix I attached."

Through the combination of the consensus-based process, a broad and diverse set of interests, commitment by the Planning Committee, and support from other participants, The SSRWMG anticipates an orderly and equitably developed regional water management portfolio. All participants understand that there may be some activities and/or projects that will not be acceptable to the full Planning Committee, but which may be pursued outside the IRWM Program by individual agencies or interests.

3.8 Approach to the Regional Water Management Group

The Southern Sierra IRWMP effort (SSIRWMP) is initiating the regional planning process. In designing its initial governance structure, the RWMG organized itself a little differently than the DWR model. The SSIRWMP governance structure has a Planning Committee that is the decision-making body during the SSIRWMP formation process. This Planning Committee oversees and approves major programmatic decisions such as funding applications and performance measures. Any qualifying entity which signs the MOU (see Appendix I) is a member of the Planning Committee.

In the case of the SSIRWMP, the Regional Water Management Group (RWMG) functions as the official pass-through of the Planning Committee decisions. It consists of members which meet the statutory requirements for inclusion in an official RWMG. In the case of the SSIRWMP, the RWMG has no independent decision-making authority and follows the directives of the Planning Committee.

The current SSIRWMP Planning Committee consists of a large group of stakeholders represented by 20-30 organizations in the region, which meets regularly for planning meetings. The Planning Committee strives to ensure its membership represents a broad range of interests, including: water supply, water quality, environment/habitat, recreation, agriculture and ranching, resource management, hydropower, cities/counties, sanitation, other water resource management Southern Sierra IRWMP RAP areas, economically disadvantaged local communities and individual local stakeholders. Interests represented on the Planning Committee currently include:

- Disadvantaged Communities
- Resource Conservation Districts
- Resource Management Agencies
- Federal Land Management Agencies
- County governments and special districts
- Environmental stewardship organizations
- Landowner groups
- Native American Tribes
- Local water and utilities purveyors
- State Agencies (CDF&W)

3.9 Planning Committee Members and Other Stakeholders

The following entities are signed the MOU in the Planning Committee:

- Sequoia Riverlands Trust
- California Department of Fish and Wildlife
- Sierra Resource Conservation District
- United States Forest Service, Sequoia National Forest
- National Park Service, Sequoia National Park
- Three Rivers Community Services District
- Yosemite/Sequoia Resource Conservation and Development Council
- Revive the San Joaquin
- Desert and Mountain RC&D
- Sierra and Foothill Citizen's Alliance
- San Joaquin Valley Water Leadership Forum
- Springville Public Utilities District
- Tulare Basin Wildlife Partners
- Fresno Metropolitan Flood Control District
- Sierra Club – Tehipite Chapter

The following organizations have participated in Planning Committee meetings but have not yet taken steps to become official members of the Planning Committee:

- Sierra National Forest
- National Resource Conservation Service, Area 3
- California Water Institute
- Tule River Indian Reservation
- Tulare County Audubon Society
- Big Sandy Rancheria
- Buckeye Ranch
- Tulare County Citizens for Responsible Growth
- Tulare County Farm Bureau
- USFS Pacific Southwest Research Station
- Foothill Engineering
- Dennison Ditch Company
- Deer Creek-Tule River Authority
- Inyo National Forest
- Wildplaces
- Fresno County
- County of Tulare
- Friends of the South Fork of the Kings River

The following water, local government agency or other organizations have been invited to participate in the IRWM Program, but to date they have only passively followed the Program. They receive monthly information, meeting notice, and minutes:

- Community Water Center
- Self Help Enterprises
- Friant Water Users
- Southern California Edison Company
- Sustainable Conservation
- Upper Kings River Forum
- San Joaquin River Parkway and Trust
- River Ridge
- San Joaquin Valley RC&DC
- Semitropic Water Storage District
- Sierra Foothill Conservancy
- North Fork Rancheria of Mono Indians
- Madera County
- Picayune Rancheria of the Chuckchansi Indians

- The Nature Conservancy
- Tulare County Water Commission
- Sierra Business Council
- Sierra Nevada Conservancy
- Coarsegold RCD
- Central Sierra Watershed Committee
- Central Unified School District
- Devils Postpile National Monument
- Kaweah Delta Water Conservation District
- Alta Irrigation District
- Chumash Council of Bakersfield
- Southern Sierra Miwok Nation
- Chuckchansi Tribe
- US Rep. Jim Costa
- Calnatives Plant Nursery
- Traditional Choinuymni Tribe
- Kern County Supervisor, McQuisten
- Sequoia Foothills Chamber of Commerce

3.10 Identifying Disadvantaged Communities

Disadvantaged Communities (DAC) are identified at this time based upon Census information provided by the Federal Government. The County of Tulare qualifies as a DAC with an average family income of less than 80% of the California median family income (2007 Census Data, U.S. Census Bureau). However, information will have to be refined through the planning process to better identify DAC priorities and needs. Through the IRWM planning process, additional outreach and refinement of data will identify specific areas of special needs in those community areas. The County of Fresno is not a DAC; however there are small communities and some areas that refined census data will probably help identify as DAC areas with the County. The Planning Committee and staff have been working to include representatives from Community Water Center, which represents many disadvantaged communities in the area.

3.11 Integrating DAC's in the IRWMP Process

The Counties which constitute almost all of the South Sierra IRWM area (Fresno and Tulare) include both valley and foothill/mountain areas within their boundaries. Their major population centers are located in the valley areas. The population in the foothill/mountain region are scattered throughout a large area and are difficult to serve. These two counties are poor with limited resources. Their cities and towns on the valley floor have many needs and are easier to serve than the somewhat less populous

communities in the foothills mountains. Consequently these more remote communities have received few services and resources.

The communities in the South Sierra IRWM area consist of approximately 17 small towns (population 1500 or less), none of which are incorporated. Approximately half of these meet the definition of disadvantaged communities, (MHI<$37,994)[5] as follows[6] (Note: This data is potentially out of date and will be reviewed with more recent census data from the American Community Survey and refined during the planning process):

There are also three federally recognized Indian Tribal Reservations or Rancherias in the region: Big Sandy (MHI 19,250), Cold Springs (MHI 35,000) and Tule River (MHI 30,625), all of which meet the DAC criteria. The towns listed above which do not meet the DAC criteria are areas where the tourism industry brings in more money and attracts higher income residents. But historically the populated areas were built around extraction or agricultural industries (mining, cattle and logging) and suffer from low income and poor infrastructure conditions. They are also generally isolated and remote. This has made it a challenge to engage the residents in the IRWM process. The SSIRWM has made consistent efforts to overcome these challenges as set forth below, but has met with only limited success to date. Based on this the proposed IRWMP planning process includes significant tasks and resources to improve the involvement of these disadvantaged communities.

The initial outreach efforts by the Sierra Nevada Alliance included identifying stakeholders in these disadvantaged communities. Staff put together a list of Tribal representatives, Community Service Districts, Village Foundations, Resource Conservation Districts and nonprofit organizations which served the communities. Continuing efforts have been made to add to this list. In addition, the SSIRWM project manager arranged meetings with Community Water Center and Self Help Enterprises, two nonprofit organizations which provide infrastructure assistance to disadvantaged communities in the larger region. Both of these entities acknowledged the needs of these communities and both stated that they did not have the resources to serve them – all of their resources are currently directed at the needy valley communities. They also gave their support to the SSIRWM effort to include these DACs in their process and direct resources toward their needs.

[5] In rural areas it is more accurate to use the 2000 Census figures rather than the Dept. of Finance estimates. This is because these estimates are not done on a small enough geographic area to capture the true income of a community.

[6] In order to get more of a picture of the communities themselves, we have listed MHI by the communities' zip codes. In rural areas, zip codes tend to be more accurate than block groups for this purpose because they follow community boundaries more accurately. Many times communities are separated into multiple block groups which, because of the low population density, also include wealthier areas in nearby cities.

There have been a few representatives of these DACs who have attended the IRWM Planning Committee meetings, including representatives from the Tule River Indian Tribe. In an effort to better reach the non-participating communities, SSIRWM representatives have done some direct outreach, but the resources for this were limited and presentations were only made in three of the DAC towns. The most effective strategy with our limited resources was to contact organizations that represented several of these communities. Meetings were held with the Sierra RCD, the Tulare County RCD, and the Tulare County Public Health department to try to understand the needs of these disadvantaged communities. The SSIRMWP has also sought additional grant funding to do better direct outreach and to provide travel stipends to DAC representatives, but to date these grant applications have not been successful.

Based on the direct experience of the difficulties in serving the region's DACs, the proposed IRWM Work Plan includes significant resources to improve DAC participation, including:

- Outreach meetings in DAC areas
- Travel/participation stipends for DAC representatives to attend meetings and workshops
- Resources to assist the DACs in establishing watershed committees - a sustainable way to promote public education and community involvement in natural resources planning and projects.

3.12 Working Relationships of Identified Agencies and Stakeholders

The SSIRWMP is a relatively recent effort. In the short time we have been provided with resources to pursue regional planning, we have been very successful in soliciting the involvement of a broad range of stakeholders. We acknowledge the need to develop closer relationships with some of the larger stakeholders and will continue to make efforts towards that end. In addition, more work needs to be done to make it possible for Disadvantaged Communities to participate in the planning meetings. The SSIRWMP has submitted grant applications for further staff funding which would allow this concentrated outreach. It should be noted that although stakeholder participation could be increased, we are confident that we have made contact the vast majority of the relevant stakeholders in this region. These entities have been informed about the process and given an opportunity to participate. No entity has been shut
out of the process and we are unaware of any entities that are purposefully boycotting the process or have serious concerns about our actions and decisions to date.

Those entities that have chosen to participate appear to have a good working relationship and have shared information on water management issues as the opportunities have arisen. Through the SSIRWMP process, we expect to further develop these relationships

and lines of communication among the participating entities. Already, sharing of information among the program participants has allowed increased knowledge about the water resource conditions within the region as it relates to their particular areas of interest. It is anticipated this educational process will provide significant dividends through facilitating a more informed discussion venue and may encourage more participants to join the program.

3.13 Mechanisms for Stakeholder Participation

The Southern Sierra Integrated Regional Water Management Planning effort (SSIRWMP) was initiated through the actions of the Sequoia Riverlands Trust, Sierra Nevada Alliance, and the Sierra Nevada Conservancy. The Sierra Nevada Conservancy provided a grant to fund a launch phase of the planning process to identify stakeholders, hold public meetings and write a grant to the California Department of Water Resources. In preparation for the initial planning meeting,
the Sierra Nevada Alliance prepared a list of stakeholder groups in the area, representing areas such as water supply, water quality, environment/habitat, recreation, agriculture and ranching, resource management, hydropower, cities/counties, sanitation, other water resource management areas, economically disadvantaged local communities and individual local stakeholders.

The IRWM Program makes consistent efforts to include more interest groups and the public in this process (see Appendix G, SSIRWMP email notification list). Additionally, meeting agendas and minutes are circulated to a broad and inclusive group of interests. These include local agencies with facilities within the region, public utilities, federal agencies, state agencies, local tribal interests, business groups, etc. The agenda and notice of the IRWM monthly meeting is posted on the SRT web page (www.sequoiariverlands.org) as well as in the SRT office
approximately 5 to 6 days in advance of the monthly meetings.

An important priority since the inception of the IRWM Program has been to provide an open forum for participation in an inclusive structure. SRT, as the managing agency, used lists of interested parties from past water resource related matters, as well as recommendations from other agencies, the public, and NGOs, to solicit interest. Every attempt was made to facilitate stakeholder participation. Planning Committee membership remains open to any additional stakeholders who wish to join by executing the MOU and complying with its terms and
conditions.

The SSIRWMP effort has, since its inception, dealt with the fundamental topics of organization that are necessary to any successful IRWM Program. Tasks were carried out with very limited fiscal resources from local and regional sources, supplemented by a

strong core of volunteer support from non-governmental organizations and technical support from state and federal agencies. Using this combination of resources the Planning Committee – over the course of
approximately one year – has reached a number of milestones.

The IRWM Program structure now covers a large geographic area including the entire upper watersheds of five major rivers and several smaller streams. The IRWM program area includes water resources of regional importance (the San Joaquin, Kings, Kaweah, Tule, Deer Creek, Poso, White and Kern). The IRWM participants list includes a compliment of local land use agencies, water resources agencies, federal and state agencies and a deeply committed group of non-governmental organization interests.

The Planning Committee is familiar with each other's responsibilities, capabilities, duties, interests and desired objectives. They have also jointly developed and executed an MOU with a supporting governance structure, and an IRWM boundary map. The Planning Committee has conducted a public outreach effort targeting a broad spectrum of interests. The Planning Committee has conducted agency and other interest briefings within its membership during its
monthly meetings. These briefings have included comprehensive presentations by members of the Planning Committee about their agency or organization.

On May 10, 2012, the SSRWMG adopted the following materials as refinements and clarifications to the existing "Memorandum of Understanding, Southern Sierra Regional Entity," originally dated 2009 (See Appendix 1). The materials do not replace the M.O.U., they merely provide additional details to eliminate ambiguity, and additional protocols on a few important topics that were not yet addressed. Together they form the governing documents of the Southern Sierra IRWMP's Regional Water Management Group.

<u>Program Management Structure (Section 3)</u>

3.3 Change of "Planning Committee" term to "Regional Water Management Group"

As of July 2012, the "Planning Committee" will be referred to as the "Regional Water Management Group" (RWMG). Per IRWM guidelines (August 2010, Section 4-A-1, Governance, page 19), the RWMG includes three or more local agencies, at least two of which have statutory authority over water supply or water management. These two agencies share decision-making authority with the other members of the RWMG. All other aspects of the Memorandum of Understanding apply.

3.4 Change of "fiscal agent" term to "grantee"

As of July 2012, the term "fiscal agent" will be replaced with "grantee," for consistency with IRWM guidelines (August 2010), which defines "grantee" as the

grant recipient (page 32).

3.5 Additional RWMG Roles and Responsibilities

Per the existing M.O.U., the RWMG will continue to oversee and approve major programmatic decisions, such as funding applications and performance measures, and will continue to set the overall strategic direction for formation of the IRWMP. Additionally, members of the RWMG will (1) review in advance of meetings and provide feedback on draft work products; (2) adopt final work products; (3) contribute expertise, data, and information to clarify discussions, eliminate false assumptions, and advance innovation; (4) communicate information to and from their agencies, organizations, and/or constituencies; and (5) act in a manner that will enhance trust among all participants.

3.6 Additional Coordinating Committee Roles and Responsibilities

Per the existing M.O.U., the Coordinating Committee will continue to assist staff with process planning, recommendations for process modifications, communications, and other issues for which staff needs advice; may also continue to provide more consistent fiscal oversight; and may also play a role in developing substantive proposals and policy, at the request and subject to the approval of the Planning Committee. Additionally, the Coordinating Committee will help to prepare for RWMG meetings by reviewing and helping to develop meeting materials, and by reviewing draft work products, as needed.

3.7 Additional Membership Requirement

Members of the RWMG must be part of a public agency, an organization, a business, a California Native American Tribe, or other group that represents a public interest and has signed the M.O.U. The M.O.U. identifies the primary representative and alternate; to keep information up to date, members are required to submit a letter written on letterhead indicating if their primary representative or alternate changes. Alternates are encouraged to attend as much as possible to maintain continuity of the discussions. A single person may represent more than one agency, organization, business, Tribe, or other group, so long as they have documentation of their role from each entity they represent. The RWMG does not include individual members of the public. Individual members of the public who are interested in and concerned about the Southern Sierra IRWMP are requested to join the list of interested parties (see section 5.2.1).

3.8 Work Group Designation

The RWMG may choose to create work groups to advance specific tasks outside of RWMG meetings. The RWMG will specific a clear purpose for any work group and,

as applicable, also specify the tasks or work products and corresponding timeline for the work group. All work groups will provide a status update on their activities at the RWMG meetings. All work products will be submitted in draft to the RWMG for adoption. While the work groups may make day-to-day decisions to advance their efforts, the work groups have no final decision-making authority (see Section 6.1.1.2).

3.9 Roles and Responsibilities of the Facilitators

The facilitators will provide impartial guidance regarding the planning and implementation process, and will manage meetings on behalf of the RWMG. The facilitators are content-neutral, which means they will not advocate for particular policy or technical outcomes; the facilitators will, however, advocate for a fair, transparent, effective, and credible dialog and decision-making process, including helping the RWMG uphold the elements of the M.O.U. Specific duties include (1) designing the work plan and meeting agendas in partnership with the Project Manager, Coordinating Committee, and other RWMG members as needed; (2) providing guidance on process options and decisions; (3) reviewing and providing feedback on draft meeting materials; (4) overseeing the preparation of meeting summaries, including action items, key points of discussion, and agreements and decisions; (5) serving as a confidant for members who wish to express concerns about content or process privately. The facilitator is in service of the RWMG and will provide equal support to all its members.

<u>Public Outreach and Participation (section 5)</u>

5.2.1 Additional Information on Public Forum / Interested Parties

[This section augments the existing 5.2 Public Forum / Interested Parties]

All interested parties are welcome to attend and participate in RWMG meetings and other Southern Sierra IRWMP events. As specified in the existing M.O.U., the RWMG maintains a list of interested parties for the purpose of noticing meetings and other public events, and sharing news and information. The list may also be used to solicit feedback to the RWMG at appropriate times. The list includes individual members of the public, as well as members of agencies, organizations, businesses, Tribes, or other groups that have an interested in or are concerned about the Southern Sierra IRWMP but do not sign the Memorandum of Understanding.

5.5 Media Protocol

Per the existing M.O.U., the Project Manager or other designated representatives may make public statements on behalf of the Southern Sierra IRWMP as an entity. The first point of contact for media or external inquiries should be the Project

Manager or other designated representatives. Additionally, if contacted by the media or an external party, or in other sessions outside the meeting, members will:

a. Clarify that they are speaking only for themselves, not on behalf of the RWMG.
b. Express concerns and support in ways that are consistent with their expressions in RWMG meetings.
c. Represent other comments made in these meetings as general group concerns and support, rather than attributing statements to other people or characterizing the views of others.
d. Avoid using the press as a vehicle for negotiation.

Members reserve the right to express their own opinion to the media, but not the opinions of others. Members can refer media inquiries to other group members, who then can speak for themselves. The RWMG may periodically develop and approve lengthier consensus statements to keep the public and media informed of its work and progress, and associated decisions and agreements.

<u>RWMG Decision-Making (Section 6)</u>

6.1.1.4 Clarification of Less than 100% Consensus Decision-Making

Decision-making in the absence of consensus will follow the protocol in the existing M.O.U. For clarification of section 6.1.1.2 (a), decisions or agreements must be endorsed by 75% of the total number of active members of the RMWG who are present at the meeting (including via telephone) when a decision is made. Per the existing M.O.U., meetings that include decisions will be noticed two weeks in advance of the meeting. For clarification of section 6.1.1.3, "regular attendance" means that the member has attended at least half of the RWMG meetings in the past year, or in the case of new members, that the member has attended at least half of the RMWG meetings since signing the M.O.U. The RWMG will maintain a current list of RWMG members, including their primary representative and alternate, and track meeting attendance. The requirement for participation in a work group is only applicable insofar as three or more work groups are active.

6.2 Protocol for Notifying Members of an Upcoming Decision

Per section 5.3, Public Noticing and Transparency, meetings that involve decision-making will be noticed two weeks in advance of the meeting. Members will be requested to acknowledge receipt of the email notifying them of the upcoming decision. If no acknowledgment is received, the facilitator(s) will follow-up by telephone to ensure the member is aware of the upcoming decision.

6.3 Multiple Entities Represented by a Single Individual

In some cases a single individual serves as the designated representative of more than one member entity. In order for the RWMG to have consensus on a decision, each of the member entities represented by the single individual must be in consensus.

If less than 100% consensus decision-making is involved, the single individual must choose a single entity to represent; any additional entity represented by that individual must send their alternate representative to take part in decision-making. All alternates are required to be fully briefed on the group's historical deliberations and information and issues involved in the decision, to ensure continuity of the group's discussions and a timely decision-making process. All decisions will be noticed in advance as specified in sections 5.3 and 6.2.

If less than 100% consensus decision-making is involved, and one of the entities represented by the single individual has a financial interest in the outcome (e.g., one of the entities represented by the single individual is applying to be the grantee for a planning or implementation grant), the single individual will be permitted to participate in discussions and decisions regarding the steps, criteria, and information used for making the decision (e.g., selection of a grantee). In this regard, they help to shape the decision-making process as a whole. During the deliberation of the decision and final less than 100% decision-making, however, this individual will be requested to leave the room, and the entity that has a financial interest in the outcome will not be part of the less than 100% consensus decision-making. Additionally, none of the other entities represented by the single individual will be permitted to be part of the deliberation of the decision and final less than 100% decision-making. This is to avoid a situation where a secondary entity, even though it has no financial interest in the outcome, sends an alternate representative to support the selection of the single individual that typically represents them out of solidarity. To ensure that it has a voice in such a circumstance, any member entity typically represented by a single individual can decide to regularly send their alternate to the series of meetings leading up to a financial decision, and thus avoid relying on the single individual to represent them during that period of the RWMG's work. The RWMG will identify the appropriate number of meetings to attend early enough in the process to allow such participation.

<u>Joint Fact-Finding (new section – section 8)</u>

8 Joint Fact-Finding Protocol

The RWMG may choose to conduct joint fact-finding when it needs to make a decision regarding a complex scientific or technical issue, but cannot readily reach agreement on how best to proceed. Joint fact-finding provides an approach to

building consensus and making informed decisions in the face of uncertainty. It involves a subset of RWMG members working with the consultant and subject-matter experts to frame the questions to be answered, interpret existing information, and generate recommendations. Joint fact-finding conducted by the RWMG will include the following steps:

1. The facilitator or RWMG member develops a short Issue Summary that identifies key issues and questions in enough detail to clearly communicate concerns to all members.
2. The RWMG identifies a few members to form a joint fact-finding work group on the designated topic. The work group identifies additional expertise needed to understand and address the topic, and invites mutually agreed-upon individual subject-matter experts to support the work group.
3. At its first meeting, the work group discusses how existing information applies to the issues and questions identified in the Issue Summary. Members identify areas where they are in consensus, and if possible, recommend to the RWMG how to move forward on the issues and questions identified. If the work group desires more information, it identifies the immediate next steps for gathering this. If the desired information does not exist, the work group decides whether it can be generated in a timeframe that is consistent with the RWMG's work plan; if not, the work group agrees to continue its joint fact-finding effort and ultimately make a recommendation the absence of ideal information.
4. At its second or subsequent meetings, the work group reviews new information and seeks consensus on what to recommend to the RWMG. If the work group makes a sincere effort but cannot reach consensus, it may provide more than one set of recommendations to the RWMG.
5. When recommendations are ready, the work group presents these to the RWMG and answers any substantive or procedural questions from RWMG members. The intent is to provide recommendations in an open, transparent, and educative way that supports informed decision-making. The RWMG in turn seeks consensus on what recommendation(s) to adopt. The RWMG may request the work group to conduct additional fact-finding and report back.
6. The final recommendation adopted by the RWMG is recorded in the Issue Summary, as well as the standard meeting summary that is made publicly available on the website.

During the joint fact-finding process, the work group will update the RWMG as to its progress during the RWMG's regular meetings.

During planning activities under the DWR planning grant, beginning in mid-2013, the planning firm will review current plan management and governance structures

and provide recommendations for improvement. The updated governance structure will be incorporated into other Plan standards including Objectives, Project Review Process, Finance, and Stakeholder Involvement and Integration chapters.

Chapter 4 - Climate Change

4.1 Introduction

Climate change is an overarching issue creating complex problems in California. Current scientific research indicates that climate change is a result of human- caused greenhouse gas emissions (GHG). Climate change impacts on water resources in California include decreasing snowpack, water supplies and air temperatures. Climate change forecasters expect that storms will continue to increase in intensity and droughts will become worse.[7] Water planners need to consider these changes when understanding water supply and demand and in order to do this, the SSIRWM Plan will take into consideration climate change impacts.

The Southern Sierra Nevada includes some of the most iconic natural resources and complex socioeconomic landscapes in the United States. Steep canyons, cut by powerful rivers bisect and transect high mountains and foothills. This, together with giant forests and woodlands which clothe the slopes causes a strong biophysical gradient. Over the span of about 40 miles, ecosystems range from foothill woodlands at about 500 feet elevation through montane chaparral and forests, and into alpine communities above 14,000 feet. The Southern Sierra Nevada Mountains are highly valued for their native biodiversity, recreational opportunities, and as a main source of water for California agriculture, energy generation, and domestic needs. The SSIRWM Region's assets benefit the people of California, the country and the world. The region is relatively unfragmented by development and its headwaters and middle elevation watersheds are almost entirely administered for public benefits. The region is also the largest contiguous area within the Sierra Nevada best suited to the management of wildland fire for multiple resource benefits and the region contains the largest contiguous wilderness area in California.[8]

Increases in temperature and changes in precipitation, hydrology and snowpack have already been observed.7 There is growing recognition that global climate change will affect long-term management options for the conservation of the Region's resources. This part of California continues to attract new residents, rapidly expanding the Region's wildland-urban interface. Air pollution is a severe and chronic problem in the Region, particular in the southern half where ozone levels regularly exceed EPA standards at mid-elevation locations. Fire management and other land use decisions during the early to middle 20th Century have severely altered the structure, composition, and fire regimes of selected plant

[7] Moser, Susanne. (2012). *Toward a Vibrant, Prosperous and Sustainable Fresno County* (White Paper). Santa Cruz: University of California, Berkeley.

[8] Sierra Nevada Conservancy (2009). *Establish a Southern Sierra Conservation Cooperative to Collaboratively Adapt to Accelerated and Unprecedented Climate Change.*

communities in the Region. Invasive non-native plants, animals and diseases have transformed some ecosystems by excluding native biodiversity and substantively altering ecosystem processes. All of these agents of change interact with one another, and affect ecosystems in ways requiring that land managers' responses be planned and executed at broad spatial and temporal scales.

The California Department of Water Resources has stated that climate change is an integral part of the integrated regional water management plan. DWR has further identified Greenhouse Gas Emissions to constitute a potentially significant impact of substantial importance which was often not appropriately considered prior to 2010. SSRWMG recognizes that GHG's are a significant cause of climate change and as such need to be considered for potential effects to the region's resources, including water.[9] This chapter identifies the SSRWMG's approach to address the importance of climate change and GHG emissions by identifying the potential regional vulnerabilities, outlining the need for further study, and establishing adaptation and mitigation strategies.

Climate Change Impacts

Projected climate change impacts on the Southern Sierra Region are summarized in the bullet points below:[7]

- An increase in average summer temperature of 2.0-6.0 °F by 2050, and 5.2-11.0 °F by 2100, and an increase in average winter temperature of 2.0-4.1 °F by 2050 and 3.7-7.9°F by 2100;
- A 22-30% increase in the number of days of extreme heat on the valley floor (over 104 °F) by 2050, and a 36-61% increase over historical averages by 2100 (Fresno experiences 92 such days /year currently);
- A decrease in the availability of state water from snow melt due to an overall decline in precipitation, and a greater proportion of precipitation falling as rain;
- Runoff from snowmelt will occur earlier in the spring, extending the period where water availability is more limited; reduced snowmelt and runoff also affects hydroelectric power production;
- An increased risk of dry years and drought as a result of higher temperatures, higher evaporation, and eventually, a decline in precipitation;
- Increasing floods due to higher number of extreme rainfall events, especially if combined with projected warmer winters and spring temperatures, when snowmelt and winter/spring rains coincide;
- A projected 300-400% increase in the total area burned annually by wildfires in the Region by the end of the century;

[9] CDM Smith. (2011). *Climate Change Handbook for Regional Water Planning*. DWR and U.S. EPA Region 9.

- A possible increase in "bad air" days (warmer air increases the formation of ozone, a key component of smog).

Table 3 below is a summary of the range of impacts that climate change may have on various sectors in the SSIRWM Region, a summary of the vulnerabilities, the possible responses and the management strategies. The Southern Sierra Region may be vulnerable to impacts of climate change in water management, forests, ecosystems, public health, infrastructure, and agriculture. This table also provides brief descriptions of the expected impacts of climate change ranging from higher temperatures to more frequent wildfires. This table was adapted from the California Climate Adaptation Strategy.[10] The initial dataset in this table was statewide, but the categories were made specific to the Southern Sierra Region. How climate change will impact the timing and availability of water from local streams, reservoirs, and the major projects (State Water Project (SWP) and the federal Central Valley Project (CVP)), has been analyzed and assessed for the potential range of impacts on the Southern Sierra Region. The results indicate likelihood for decreased snowfall, more rain, earlier snowmelt, higher flood intensity and risk, higher erosion, greater wildfire potential, longer droughts, higher temperatures, and increased storm frequency and strength.9 These impacts will affect water supply availability to the Tulare Basin; impacts will be common among regional IRWMs, thus creating a suite of vulnerabilities and the potential to collaborate on a large scale to address the vulnerabilities:

- The quantification of the associated impacts will allow the Tulare Basin IRWMPs (See Table 4 below for constituent groups) to consider reprioritization of their plans based upon a more developed picture of regional impacts and allow them to strategically pursue plans to mitigate all of these impacts;
- In response to these vulnerabilities, a collaborative effort will be made to evaluate the Tulare Basin's vulnerabilities to the effects of climate change because the impacts of climate change extend beyond the SSIRWM boundaries. This effort will also work to identify potential adaptation responses that the SSIRWM and neighboring regions could choose from to address those vulnerabilities.

Representatives from the SSRWMG already attend Tulare Basin Regional IRWM meetings to collaborate on this large scale.

Many of the impacts of climate change are inevitable because of current levels of greenhouse gas emissions already in the atmosphere. Preparing for these impacts and to

[10]California Natural Resources Agency. (2009). California Climate Adaptation Strategy.

reduce their severity is called *adaptation*.[11] As a result of these anticipated impacts, one of the goals of the SSIRWMP is to prepare future climate change adaptation strategies. The most pertinent strategies for the Southern Sierra Region are included below.

The greatest impact uncertainty in the Region relates to precipitation changes. In the SSIRWMP Region, there are many experts that are working to analyze the projected impacts for this region, including federal agencies, state agencies, non-profits and local government. Climate models have been adapted for this region by ClimateWise, the California Energy Commission's Climate Change Center, independent consultants, and the California Department of Water Resources, California Audubon and The Nature Conservancy. The main utility of these studies and analyses is to help communities picture what the conditions and landscape may look like in the future and the magnitude and direction of change so that mitigation and adaptation can occur.

Uncertainty associated with projections of future conditions should not be used as a reason for delaying action on climate change. The likelihood that future conditions will resemble historic conditions is very low, so managers and policy makers are encouraged to begin to plan for an era of change, even if the precise trajectory or rate of such change is uncertain.[11]

4.2 Climate Change Vulnerabilities

The Southern Sierra IRWM Region and its water resources are vulnerable to the myriad challenges that climate change poses. As a result, this plan is designed to establish a framework to help local and regional managers with the task of preparing for expected climate change impacts. This task includes addressing potential climate change issues in the region including impacts to the quantity of water, timing of water supplies, flooding, and mitigation of greenhouse gas emissions from new water projects for local streams. A majority of on-the-ground water supply comes from surface water from local streams, which depend upon the snowpack to regulate runoff from the western slopes of the Sierra Nevada Mountains.

The Southern Sierra Region includes several headwaters but occasionally relies on water that originates in other planning areas. Potential increases in demand and reductions in supply from other regions pose a risk to the SSIRWM Region. This strongly states the case for regional self-sufficiency as described in Thomas Zuckerman's paper.[12] While this plan is not intended to provide the region with a blueprint for achieving complete self-sufficiency,

[11]Koopman, Marni, Nauman, Richard, & Leonard, Jessica. (2010). *Future Climate Conditions in Fresno County and Surrounding Counties*. The National Center for Conservation Science and Policy: Climate Wise.

[12] Zuckerman, Thomas. (2007). "A Water Plan for the 21st Century: Regional Self-Sufficiency Scenario." Healthy Delta Communities Plan.

the goals and objectives steer the region in that direction. The need is more clearly defined based on the regional and issue by issue vulnerabilities described below.

4.3 Regional Vulnerabilities

- **Delta Dependent Water Supply Vulnerability** – The reductions in water supply and reliability associated with waters conveyed through the Sacramento-San Joaquin River Delta are having a significant impact on Tulare Basin's water balance and as a consequence, the sustainability of regional groundwater supplies. Collaboration at the level of the funding Region, or greater yielding a planning effort for the Tulare Basin should analyze the range of current and future water supplies dependent upon Delta conveyance. This effort should begin with a general quantification of impacts experienced to this water supply since the Wanger Decision in 2007 regarding salmon restoration on the San Joaquin River and should estimate the range of future impacts assuming that Delta constraints remain. Climate change impacts that may affect Northern California water supplies and Delta conveyance should be incorporated into this analysis to form a complete picture of the range of potential impacts. This will add demand to local watersheds' water supplies.

- **San Joaquin River Sourced Water Supply Vulnerability** – Similarly, it has been forecast that there could be significant reductions of water supplies to the Tulare Basin associated with the restoration of flows in the San Joaquin River (SJR) to support a natural, sustainable, anadromous fishery. The Friant Division of the Central Valley Project, via the Friant-Kern Canal, supplies the Tulare Basin with significant surface water supplies. While the SJR salmon restoration efforts have a goal of minimizing water supply impacts to those who have relied on this source of water for the past sixty years, significant impacts are nonetheless forecast. There is some planning underway by the U.S. Bureau of Reclamation to mitigate the water supply impacts, including recycling and other strategies, but the ability to address all of the potential impacts to the Tulare Basin is unlikely and at best, uncertain. Reductions to SJR water supplies will have an impact on regional water balance and as a consequence, the sustainability of regional groundwater supplies. A planning effort for the Tulare Basin should address the region's range of current and future SJR originated water supply availability. This effort should begin with a general quantification of impacts experienced to this water supply since the passage of the SJR Settlement Act in March of 2009 and should estimate the range of future impacts assuming full as well as limited mitigation of the impacts from reduced diversions into the Friant-Kern Canal and from Mendota Pool. Climate change impacts that may affect SJR flows and water supply availability should be incorporated into this analysis to form a complete picture of the range of potential impacts.

Sector-Specific Vulnerabilities for the Southern Sierra Water Management Region

- **Water Supply and Demand**: Climate change will stress supply and create additional demand as ecosystems human communities require more water. It is projected that water supply could decrease while demand increases, however, supply may increase during times or in places when and where it is difficult to utilize.7 Higher temperatures are also projected for the future creating problems with runoff timing, cold water pools and wildlife in-stream temperature requirements. Because of these higher temperatures, snowmelt will occur earlier in the season, effectively changing the timing of water supply. In the southern Sierra, because of the high elevations, projected snowpack changes may be dramatic, but this Region may retain the greatest snowpack in the Sierra. This will create additional water supply problems because there will be less natural water storage at times when water managers could rely on a delay in runoff because of the snowpack; there will be fewer or smaller natural water reservoirs. Along with earlier snowmelt, there will be more precipitation in the form of rain and less of snow. This will cause the water supply to diminish, a decrease in water quality (see below) and less groundwater recharge. With an increase in precipitation in the form of rain, there will be larger flooding events that will negatively impact reservoir operations and damage conveyance. Increasing water temperature will also create longer and more frequent droughts. This results in reduced water supply and increased water demand, fewer recreational opportunities, poor water quality and less groundwater recharge. Higher temperatures will also create less freeze events giving more opportunities for agriculture to have longer growing seasons. This will require more water for the agricultural sector, increasing the water demand.[13]

- **Water Quality**: Water quality will be vulnerable during extreme weather events including higher temperatures, longer and more frequent droughts, earlier snowmelt, more rain, less snow, more frequent extreme flood events and a decrease in the number of freeze events. Extreme weather following long droughts will create landslides, erosion and sedimentation. Water quality would also be vulnerable to deterioration because of chemical buildup resulting from a decrease in surface and groundwater.7

- **Flooding**: More frequent or more intense storm events following an extreme drought will result in flooding, imparting a variety of vulnerabilities on many different sectors. Flooding may cause vulnerabilities in water quality, agricultural productivity, biodiversity, economic and recreational, and stream channel stability.

[13] California Natural Resources Agency. (2009). California Climate Adaptation Strategy.

Agricultural productivity could decrease if crops are destroyed. Erosion and changes in riparian vegetation will occur. Flooding also creates a dangerous situation for the general public in the form of damage to transportation, wastewater and energy infrastructure. There is also an increased risk of disease because of water-borne or vector transport with floods.7

- **Ecosystem Services**: As stated earlier, climate change will have great impacts on ecosystems and ecosystem services. In the Southern Sierra Region, wildlife and fisheries will be vulnerable to range contraction and extirpation because of high levels of endemism (unique species occurring nowhere else). Wildlife corridors will be vulnerable because of habitat fragmentation caused by precipitation and temperature changes and exacerbated by human-caused development and associated fragmentation. Climate envelope/habitat changes may occur more rapidly than a species could accommodate or adapt. Higher temperatures will increase water temperatures and leave ecosystems vulnerable to moisture deficits, longer dry periods, droughts and catastrophic fires. It will also create biodiversity shifts, increases in disease and invasive species, and phenological changes, while earlier snowmelt will create barriers to species migration patterns.[7]

- **Hydropower**: There are 150 hydropower facilities in the higher elevations of the Region. As temperatures rise because of climate change, spring runoff will occur up to six weeks earlier, affecting the higher dams in areas like Kings and San Joaquin leaving energy sources vulnerable to shortage and inadequate storage options.[14] With earlier runoff, peak energy production will occur earlier in the season reducing the amount of energy that can be provided in the summer, when it is most needed.[15]

- **Public Health**: Heat, resulting from increased average temperature, is going to be a substantial problem in terms of ground level ozone, especially in the foothills where pollution is already an issue. The foothills could increase their days with "conditions conducive to ozone" 25 to 80 percent by 2100. This increase in temperature could leave citizens and visitors vulnerable and lead to air quality related deaths and/or heat strokes during high temperature/extreme heat events. The greatest number of heat related deaths occurred during the 2006 heat wave in the low-lying regions of

[14] Null SE, Viers JH, Mount JF (2010) Hydrologic Response and Watershed Sensitivity to Climate Warming in California's Sierra Nevada. PLoS ONE 5(4): e9932. doi:10.1371/journal.pone.0009932

[15] Cayan, D., Moser, S., Hanemann, M., Andrew, J., Pittiglio, S., & Franko, G. (2012). *Our changing climate 2012: vulnerability & adaptation to the increasing risks from climate change in california*. Retrieved from http://uc-ciee.org/downloads/Our Changing Climate 2012.pdf

the San Joaquin Valley. With more frequent heat waves and droughts, more people will be vulnerable to heat related deaths. People in this Region live in DACs and most of these people cannot afford an air conditioner or to run air conditioning units during extended heat waves, leaving them vulnerable to heat exposure.[16]

- **Agriculture**: Agriculture is very important to the Southern Sierra IRWM Region and for the state of California. The counties in the SSIRWM Region rank highly in economic agricultural production. Some of the crops that are grown are very susceptible to changes in temperature and water. Nut trees, like pistachios, almonds and walnuts will be affected by the higher minimum temperatures at night. As stated in the California Adaptation Planning Guide, heat severity can cause multiple problems, including: actual temperature and humidity fluctuations, the length of the heat stress period, the degree of night cooling, ventilation and air flow, housing (type, ventilation, overcrowding), water availability. A decrease in agricultural productivity will leave jobs and the economic stability of the Region vulnerable.[9]

4.4 Interregional Collaborative Opportunities

It is important to recognize the variety of needs in the different regions and watersheds covered under the SSIRWMP. By assessing these needs, the region can help adapt to and mitigate climate change impacts.

Agents of change threaten to alter some key ecosystem functions of the Southern Sierra Nevada, such as provision of clean air and water, biodiversity, maintenance of soil fertility, flood attenuation, and sustainable provision of amenities and commodities valued by humans. Many of these impacts stem from continued human use and stress on natural resources while underlying changes in temperature and precipitation amounts and timing take place.

Federal, state, tribal and local land managers and stakeholder organizations recognize that this combination of anthropogenic "change agents":

1. are interacting and amplifying impacts on biodiversity and key ecosystem functions;
2. are likely to drive some valued ecosystem elements out of the region or to extinction;
3. are challenging our views and traditional land management practices;
4. transcend ownership and administrative boundaries.

[16] California Emergency Management Agency. , & California Natural Resources Agency (2012, July). *California adaptation planning guide*. Retrieved from http://resources.ca.gov/climate_adaptation/docs/APG_U

In addition, SSIRWM Region land managers and stakeholders:

1. have differing, often opposing mandates and values, and with the exception of fire management, conservation decisions and actions are relatively uncoordinated;
2. have complementary expertise, capabilities, land bases, fund sources and more, that when added together through collaboration, can be greater than the sum of the parts;
3. recognize that collaboration at a regional scale is necessary to protect shared values from being adversely affected by these agents of change;
4. need to approach the challenge "head on" to create resilience, resistance, and in other ways adapt to the combined impacts of agents of change.

Because the SSIRWMP Region lies in the headwaters of many Southern Sierra watersheds, integration with downstream water management entities is essential. Further, it is crucial to understand the needs of surrounding regions and climate change impacts on SSIRWM areas in order to also predict and respond to impacts downstream. The SSRWMG reviewed surrounding IRWM regions' plans for their approach to climate change and possible ways to integrate with the approaches. Also, the Consumnes, American, Bear and Yuba rivers IRWMP (a key IRWMP model for the SSRWMG) climate change analysis was summarized. Through participation in the Tulare Lake Basin Regional IRWMP/Joint Powers Agreement process and meetings, the SSRWMG will integrate with surrounding regions and be able to collaborate on a large scale to understand and address climate-based issues.[17]

[17] California Department of Water Resources. (2010, August).*Proposition 83 & proposition 1e integrated regional water management*. Retrieved from http://www.water.ca.gov/irwm/grants/docs/Archives/Prop84/Guidelines_PSPs/GL_Final_07_20_10.pdf

Table 3: Potential Climate Change Impacts, vulnerabilities, adaptation and management strategies by sector.

Sector	Impacts	Vulnerabilities	Adaptation Options	Management Strategies
Water Management	Diminished water supply, poor water quality, more stress on levees, less groundwater recharge, damage to conveyance, higher agricultural demands from longer growing season, fewer recreational opportunities	Vulnerable to water shortages supply reduction from Sacramento-San Joaquin Delta or San Joaquin River and local rivers, changing seasonal precipitation, groundwater supplies, surface water supplies, agricultural demands, extreme weather events, causing floods and storage challenges, invasive species	Provide access to air conditioning in communities, encourage projects that stabilize soils, preserve critical habitats and farmland, improve agricultural water efficiency, recycle municipal water, work with local, regional and statewide partners to assess the impacts of precipitation variability, match water quality to its use, restore ecosystems, prevent outbreaks of invasive species, limit fragmentation from development	Mix land uses, practice ecosystem restoration and preservation, encourage natural resource management to improve water quality and soil fertility, educate about conservation, restore and protect aquatic environments, reduce household irrigation use, promote renewable energy, model flood and landslide risks and identify response strategies, understand supply variability and sustainable use, develop additional supplies.
Agriculture	Longer growing season, less summer water, shifts in crop type, reduced water supply reliability, crop loss, increase in invasive species, loss of agriculture land, decreased yield	Reduction in supply from Sacramento-San Joaquin Delta or San Joaquin River and other southern Sierra Rivers, changing seasonal precipitation, groundwater supplies, surface water supplies, agricultural demands, extreme weather events, invasive species, economic loss	Encourage projects that stabilize soils, identify and preserve critical habitats and farmland, improve agricultural water efficiency, match water quality to its use, prevent outbreaks of invasive species, limit fragmentation from development	Mix land uses, encourage natural resource management to improve water quality and soil fertility, educate about conservation, protect aquatic environments, understand supply variability and sustainable use, develop additional supplies.
Forests	Biodiversity shifts, habitat loss, increased erosion, changes in riparian vegetation, invasive species, reduced water quality and productivity for aquatic species, drier fuel moistures, greater fire hazards.	Changing seasonal precipitation, groundwater supplies, surface water supplies, extreme weather events, invasive species, watersheds vulnerable to erosion, landslides and floods after large fires.	Encourage projects that stabilize soils, preserve critical habitats and farmland, work with local, regional and statewide partners to assess the impacts of precipitation variability, restore ecosystems, prevent outbreaks of invasive species, limit fragmentation from development	Mix land uses, encourage natural resource management to improve water quality and soil fertility, educate about conservation, practice ecosystem restoration and preservation, protect and restore aquatic environments
Ecosystems	Increased water temp and moisture deficits, biodiversity shifts, phonological changes, reduced stream flow, invasive species, poor water quality, reduced productivity, economic loss, stream channel changes, poor water quality, catastrophic fire.	Reduction in supply from Sacramento-San Joaquin Delta or San Joaquin River, changing seasonal precipitation, groundwater supplies, surface water supplies, agricultural demands, extreme weather events, invasive species, type and habitat conversion after large fires.	Encourage projects that stabilize soils, preserve critical habitats and farmland, work with local, regional and statewide partners to assess the impacts of precipitation variability, restore ecosystems, prevent outbreaks of invasive species, limit fragmentation from development	Mix land uses, encourage natural resource management to improve water quality and soil fertility, educate about conservation, practice ecosystem restoration and preservation, protect and restore aquatic environments
Public Health & Safety	Mortality rate increases, lower air quality, more allergens, illnesses exacerbated, diminishing water supply, poor water quality, change in prevalence and spread of disease, displacement	Changing seasonal precipitation, more severe and longer droughts, higher temperatures, extreme weather events	Educate caregivers about dangers of heat, drought, and severe weather, provide access to air conditioning, work with local, regional and statewide partners to assess the impacts of precipitation variability	Educate about conservation, protect aquatic environments, reduce household irrigation use, promote renewable energy
Infrastructure	Higher summer seasonal energy demand, increased outages, increased energy variability, more reservoir	Changing seasonal precipitation, extreme weather events, economic loss	Provide access to air conditioning, encourage projects that stabilize soils, preserve critical habitats and farmland, improve agricultural	Mix land use, educate about conservation, reduce household irrigation use, promote renewable energy

	spills, damage to transportation and energy infrastructure, higher agricultural energy demands		water efficiency, recycle municipal water, limit fragmentation from development	

The requirement to incorporate climate change into the IRWM plan is relatively new.[18] In order to have a standards-compliant plan under current legislation and to be able to apply for IRWM implementation grants, applicants must address climate change. Below (Table 4) is a summary of where the neighboring IRWMP groups are in terms of addressing climate change in their plans. Several regions are in the process of updating their plans and the SSIRWMP will be updated with the new information 2013-2015. Representatives from the SSRWMG will collaborate with neighboring regions to understand unique and mutual water management issues related to climate change. Included is a summary of each region's climate change approach and some opportunities for integration and collaboration. This is essential in assessing and identifying needs and strategies to address mutual impacts and vulnerabilities.

Table 4. Summary of the IRWMP climate change analyses in the Tulare Basin.

Status of Climate Change Analysis and Planning in the Tulare Basin				
			To be Addressed with	
Planning Area	**Addressed in Current Plan**	**Addressed to Current DWR Requirements**	**Round 1 Planning Grant**	**Round 2 Planning Grant**
Upper Kings	Yes	No	Yes	N/A
Kern County	Yes	No	No	No
Poso Creek	Yes	No	No	No
Kaweah River	Yes	No	No	No
Deer Creek and Tule River	No	No	No	No

[18] California Department of Water Resources. (2010, August).*Proposition 83 & proposition 1e integrated regional water management.* Retrieved from http://www.water.ca.gov/irwm/grants/docs/Archives/Prop84/Guidelines_PSPs/GL_Final_07_20_10.pdf

Southern Sierra	No	No	No	Yes

The Upper Kings Basin IRWMP concentrated on the surface water system, the groundwater system, historical conditions, and overdraft problems. It focused on the land use change impacts on groundwater along with future growing conditions. The groundwater is recharged during wet years, and is pumped during dry years. Understanding a stable supply and demand will be integrated into this plan for future generations. In order to meet this, there will be a study to see the demand and supply by 2030. The groundwater is hardly regulated and monitored, making overdraft a problem. [19]

The Kern IRWMP looked into the possibilities of drought along with mitigation and adaptation strategies. It also analyzed surface flooding due to increasing water due to shifts in snowfall to rainfall. This region only receives approximately six inches of rain, making it a semi-desert landscape. Thus, groundwater is an important freshwater source. It is expected that there will be milder winter temperatures with an early arrival of spring. As a result of climate change, the Kern region is expecting increased temperatures, reduction in Sierra Nevada mountain snow depth, early snow melt, changes in water quality, increased evapo-transpiration rates from plants, soils, and open water surfaces, increased irrigation needs, increased agricultural water demands due to longer growing seasons and greater ET rates, and increased flood risk, creating conflicts between water storage and flood control. [20]

The Inyo-Mono IRWMP states their understanding of anthropogenic climate change and the need to understand the effects on water resources. The region stresses the importance of understanding a decrease of snowpack in the Sierra Nevada mountains and the potential conflicts for agriculture, urban and industrial users. The plan also discusses the importance of energy when transporting water from one area to another. The adaptation strategies in the plan are as followed: provide sustainable funding for statewide and integrated regional water management; fully develop the potential of integrated regional water management; aggressively increase water use efficiency; practice and promote integrated flood management; enhance and sustain ecosystems; expand water storage and conjunctive management of surface water and groundwater resources; fix delta water supply, quality and ecosystem conditions; preserve, upgrade and increase monitoring, data analysis and data management; plan for and adapt to sea level rise; and identify and fund focus climate change impacts and adaptation research and analysis[21]

[19] Upper Kings Basin Water Forum and Kings River Conservation District. (2007). *Upper Kings Basin IRWMP*

[20] Kennedy/Jenks Consultants. (2011). *Kern IRWMP*

[21] Drew, Alpert, Kattelmann, Mclnemy. (2011). *Inyo-Mono IRWMP*

The CABY Region is not a neighboring region, but it has served as an example for the SSIRWMP. The CABY Region plans on preserving water resources environmentally and economically. The CABY region also understands the importance of habitat restoration and the current endangered and sensitive species in the area, specifically in riparian habitats. There are an abundance of cold water fish, such as salmon and trout, which are expected to be affected in response to climate change. [22]

Just as important are the legal and policy decisions affecting the diversion of water from the Sacramento-San Joaquin Rivers' Bay Delta as well as efforts to restore an anadromous fishery on the San Joaquin River. Thus, consideration should be given to an analysis of not only climate change vulnerabilities but also the vulnerabilities created by the range of potential impacts associated with these other major sources of water supply uncertainty to the Tulare Basin.

Uncertainty associated with projections of future conditions should not be used as a reason for delaying action on climate change.[23] The likelihood that future conditions will resemble historic conditions is very low, so managers and policy makers are encouraged to begin to plan for an era of change, even if the precise trajectory or rate of such change is uncertain.[24]

4.5 Recommendations

Water managers will be increasingly hard-pressed to balance the costs, benefits, and risks between too little water when it is most needed, and too much water, when it is not. To address this, this plan takes into consideration the importance of mitigating and adapting to climate change. This will be an important aspect when determining future projects and plans, and will be weighed upon during decision making. The following general recommendations were developed:

- Provide sustainable funding to fully develop the potential for integrated regional water management;
- Aggressively increase water use efficiency;
- Practice and promote integrated flood management;
- Enhance and sustain ecosystems;

[22] Cosumnes, American, Bear Yuba Watersheds. (2006). *CABY IRWMP*

[23] Committee on America's Climate Choices; National Research Council. (2011). *Americas climate choices* . Retrieved from http://www.nap.edu/catalog.php?record_id=12781

[24] Koopman, Marni, Nauman, Richard, & Leonard, Jessica. (2010). *Future Climate Conditions in Fresno County and Surrounding Counties*. The National Center for Conservation Science and Policy: Climate Wise.

- Expand water storage and conjunctive management of surface and groundwater resources;
- Preserve, upgrade, and increase monitoring, data analysis, and management;
- Identify and fund focused climate change impacts and adaptation research and analysis.[25]

Specific recommendations for the Southern Sierra IRWM Plan can take one of two main forms. These can be to address either the mitigation or adaptation of climate change. Taking this multi-faceted approach will help to reduce the anticipated effects of climate change, while at the same time, increase the capacity for responding to the effects. The following mitigation and adaptation strategies have been selected to amend the current and future resource management strategies and to generally correspond with those in the California Water Plan.

Mitigation Strategies (Preventing the emission of greenhouse gases and other contributing causes to climate change):

- Mix land uses which can reduce GHG and air pollutant emissions;
- Encourage natural resource management practices that do not release pesticides or fertilizers into water systems which will work to improve water quality;
- Implement natural resource management practices that restore and improve soils to help increase the uptake and storage of carbon in soils;
- Promote and educate about water sustainability and conservation to help reduce the demand on regional water resources;
- Protect aquatic environments to reduce future sensitivity to water supply and demand fluctuations;
- Improve regional water resource management to be aware of projections of future supply and demand;
- Strategically protect water habitats and allow only moderate grazing to protect rare species[26];
- Pursue specific extreme weather mitigation techniques;
- Reduce household irrigation and the use of residential swimming pools;
- Promote xeriscaping instead of grass and create incentives to do so;
- Promote renewable energy like hydropower.

[25] California Department of Water Resources. (2008, October). *Managing an uncertain future* . Retrieved from http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf

[26] Lawler, J. et. al. (2009). Frontiersinecology and the environment.*Front Ecol Environ*, doi: 10.1890/070146

Adaptation Strategies (Planning for the inevitable impacts from climate change and reducing vulnerability to those impacts):

- Prepare for future heat influxes:
    - Provide access to air conditioned cooling;
    - Identify and provide cooling centers for the most vulnerable populations;
    - Establish cooling centers that are opened at preset temperature thresholds;
    - Plan to establish mobile cooling centers during power loss or reduction events;
    - Educate institutional caregivers that care for the most vulnerable citizens about potential heat problems;
    - Educate child caregivers about the importance of drinking water, reduced exercise and overheating and the dangers of enclosed areas without ventilation;
- Encourage projects that stabilize soils to prevent the effects of runoff and increased erosion that result from increased rainfall and storm severity;
- Preserve open space and critical environmental lands to increase water retention by reducing runoff, flooding, and fostering groundwater recharge;
- Preserve farmland from development to ensure that agricultural productivity remains high;
- Improve agricultural water use efficiency to reduce water demand and increase supply;
- Actively recharge groundwater resources to reduce the impact of future water shortages and provide a potential source of additional supply;
- Implement water conservation and sustainability programs to increase social capacity to adapt to future water shortages;
- Work with U.S. Forest Service staff and CalFire to assess the impacts of precipitation variability vs. the dominance of rain/snow inputs at headwater streams;
- Recycle municipal water for increased water supply reliability;
- Match water quality to its use to ensure water quality protection;
- Manage urban runoff for the protection of habitat, flood control, and water quality protection;
- Restore ecosystems and forests to provide habitat and water quality protection, and flood control;
- Use Agricultural Water Management Council Efficient Water Management Practices (EWMP) to improve water efficiency and supply and demand.

Specific Strategies for the SSIRWM Region:

- Increase protection of grasslands and oak woodlands accompanied by climate-adapted management practices;

- Work with contiguous downstream IRWMP regions to re-connect and restore the functionality of riparian habitats and corridors;
- Prevent new invasions of invasive species and strategically reduce existing occurrences;
- Address socio-political barriers to vegetation and fire management practices needed to abate the threat of intense, type-converting wildfires in chaparral and mixed conifer systems;
- Monitor and adaptively manage priority species and individual parks, forests and preserves within a regional context;
- Foster land use decisions and practices that limit landscape fragmentation and maintain the ability of species to move through the landscape;
- Build on existing momentum for collaborative conservation and climate change adaptation in the region[27];
- Work with tribes, communities, fire safe councils, resource conservation districts and resource conservation development councils.

The Climate Change Handbook also provides metrics that could be useful in quantifying the effects of the adaptation and mitigation strategies listed above. These include:

- Reductions in average or peak water demand;
- Creating additional supply or supply reliability;
- Offsetting potable demand;
- Reducing stream temperatures or pollutant concentrations;
- Studying the presence or absence of key indicator species;
- Measuring acreage of a certain habitat restored/protected;
- Measuring the volume of flood storage provided;
- Determining the storm return period.

4.6 Conclusion

Climate change will impact the Region in a variety of ways, some potentially severe, with direct impacts on its people, its all-important agricultural sector (and related economic activity), its supporting infrastructure and services, as well as the natural environment on which much of the region's economy, rural character, and quality of life depends. These impacts must also be recognized to portend economic impacts for the region as well. Because of the potential combined impacts that climate change will have on the Region and how vulnerable its water resources become under various temperature and precipitation scenarios, it is important to include projects that provide adaptation and mitigation strategies and promote resilience.

[27] Southern Sierra Partnership. 2010. *Climate-adapted Conservation Plan for the Southern Sierra Nevada and Tehachapi Mountains*, San Francisco, CA.

The region's leading economic sector – agriculture and closely associated industries – is the most vulnerable to climate change because of its dependence on sufficient water resources and for grazing, forage quantity and quality, particular temperature regimes for crops and livestock, and the absence of extreme events (e.g., droughts or floods). In particular, smaller farmers and those with less diverse crop and livestock systems and limited resources to invest in adaptive technologies will be most vulnerable to climate change in the future. [28] Water quantity (as noted above) and quality for ecosystems and people could become especially problematic as well.

The Southern Sierra IRWM Region will continue to face challenges in managing water resources in the face of a rapidly changing climate. The Region is vulnerable and is beginning to assess the magnitude of this vulnerability. Regional water managers are working collaboratively to address these impacts by identifying opportunities for integrated resource management. Through DWR's IRWMP process, the SSIRWM Region now has this framework in place to plan for climate change by implementing adaptation and mitigation strategies that are best suited for its unique characteristics.

[28] Moser, Susanne. (2012). *Toward a Vibrant, Prosperous and Sustainable Fresno County* (White Paper). Santa Cruz: University of California, Berkeley.

Chapter 5 - Issues, Goals, and Objectives

This IRWMP provides an integrated planning framework and management structure from which local and regional water management policies, projects, and programs can be formulated, evaluated, and implemented. The RWMG first worked to develop a consensus on the regional problems, issues, potential conflicts, and some of the project needs in the region. Goals and objectives were then established to address these issues and to set the stage for the development of the projects, programs, strategies, and actions. This chapter defines the key issues, goals, and objectives that the Southern Sierra RWMG defined during public meetings. The waters of the SSIRWM region have many uses and users downstream, as well as in-stream, source water, and higher elevation users; this variety of needs challenges resource managers. The goals established herein have been created to address the variety of water management needs of the SSIRWM Region.

5.1 Development of Southern Sierra IRWM Plan Goals, Objectives, and Resource Management Strategies

These goals were established through collaborative processes which have included RWMG meetings, stakeholder surveys, public meetings, and discussions. Having received a wide range of input while establishing goals, the RWMG has been able to define projects, goals, and strategies that will ensure that the IRWMP will work for as many stakeholders as possible. This chapter will further outline the strategies that the SSIRWMP will use to enhance water management.

5.2 IRWMP Goals and Objectives

The guidelines set forth by DWR require that each objective include success measures, which may either be qualitative or quantitative depending upon the nature of the goal. The guidelines also require either that the goals be prioritized, or that reasons be given as to why they are not prioritized. Each objective may be affected by climate change. Climate change was considered in prioritizing and creating objectives and describing how each fits into the overall State strategy for greenhouse gas reduction as mandated by AB 32. The work built upon previous efforts, including local and watershed-scale studies and watershed assessments, as well as agency plans. The objectives were initially established in 2009, so they could be used to guide the identification and selection of projects and the evaluation of resource management strategies in this plan and stakeholders would have maximum ability to provide input.

Water management issues for the region are broad and include water supply, water quality, flood management, environmental stewardship, water transfers, regional self-sufficiency, and infrastructure development. Many IRWM Planning Committee agencies and

interest groups have participated in complex resource management programs and processes including but not limited to: Forest Land and Resources Management Plans, City and County General Plans, Federal Energy Regulatory Commission hydroelectric license processes, California Environmental Quality Act preparation and review, National Environmental Policy Act review and other administrative actions. These programs have identified water management issues for the region, which were compiled as part of the IRWM Planning process. Additional key issues that have already come to the surface include:

- The need to provide clean, sustainable and affordable water supply for the communities in the IRWM Program area, particularly DACs.
- The presence of water rights holders whose customers are located outside of the Program area and the watersheds. These present a challenge common to many areas of California water resources where there is a disconnect between source waters and use of those waters chiefly for municipal and irrigation purposes.
- Development is guided by General Plans that were adopted by the land use planning agencies (local governments). Population growth in the IRWM region has generally exceeded the California average annual growth rate. The foothill and mountain communities in the Program area expect to continue to grow, causing additional stress on the environment and water supplies.

The RWMG and stakeholders developed the following preliminary goals in stakeholder and outreach meetings for the planning region during planning in 2008-2011:

1. Water Supply Management
    a. To reliably meet the long-term water requirements of both the region and the downstream interests, we must address the issues of water supply and water use. Water supply includes water storage, water diversion, water infrastructure, and groundwater availability. Water use includes both the growth in demand and the potential for increased conservation, recycling, and other efficiencies. It is particularly important to manage groundwater resources to ensure sustainability (i.e., extraction and recharge remain in balance).

    b. Establish regional self-sufficiency protocols. In a 2007 report on regional self-sufficiency, groundwater recharge was identified as a critical element in improving regional water supply.[12]

    c. Ensure adequate water supply to meet the region's expected needs between now and 2050 while minimizing environmental impacts.

2. Water Quality Management
    a. Provide drinking water that meets California health standards
    b. Protect aquifers from contamination
    c. Protect natural streams and recharge areas from contamination and uses which compromise integrity
    d. Maximize beneficial use of recycled water

3. Integrated Flood and Fire Management
    a. Develop integrated flood management strategies that improve environmental conditions in floodplain and riparian corridors and maximize natural floodwater retention strategies.
    b. Identify particular watersheds and downstream communities for projects that create more resiliency to volatile flood and drought cycles expected with climate change.
    c. Incorporate integrated flood management strategies into transportation, land development, resource management and water resource use decision-making.

4. Incorporate land use policies that minimize the risk of fire through building codes, mandatory buffers, fire safe vegetation, and home building location;

5. Environmental Resource Management
    a. Preserve open space and natural habitats that protect and enhance water resources and species in the SSIRWM region.
    b. Integrate fire and fuel management with water management, including watershed health.

6. Stakeholder Involvement and Outreach
    a. Provide an ongoing, inclusive framework for efficient intra-regional cooperation, planning and project implementation
    b. Increase communication and engagement with California Native American Tribes
    c. Build local and regional partnerships and relationships to develop local financing sources, leverage resources and build capacity

7. Integrating Land Use and Water Management
    a. Improve integrated land use planning to support water management
    b. Promote best practices in range, forest and land use management
    c. Leverage the recent legal changes for general plan recognition of disadvantaged communities in the housing element (SB 244 Wolk, Chapter

513, Statutes of 2011) and the kick-off of the Tulare Lake Basin Disadvantaged Community Water Study to improve conditions for DAC's in the SSIRWMP region

d. Develop foundation for future development of portions of the California Water Plan Task 4: Resource Management Strategies

8. Climate Change
    a. Enable planning for adaptation to future changes in climate
    b. Develop mitigation strategies

5.3 Objectives

The objectives were refined for drafting this plan and the RWMG anticipates reviewing and further refining the objectives during the 2013-2015 planning funded by the DWR planning grant.

Objective: Maximize natural storage of water by promoting meadow restoration, stream restoration and floodplain groundwater percolation.

The ability of natural systems to store water is of vital importance to the SSIRWMP. Changing land use patterns, expanded development, degraded ecosystems, and climate change will all affect how natural systems store water. Meadows, streams, and floodplains all serve critical roles in storing rainfall, runoff, and stormwater. Promoting and enhancing these natural systems will help to expand the capacity of the natural landscape to store water. Similarly, climate change and land use impacts will directly affect our ability to store water. A diminishing snow pack will require maximizing water storage on the land, particularly in meadows and wetlands. Reduce unnatural channel cutting and consequent dewatering/water table lowering in meadows and wetlands.

Objective: Perform and support hydrological capacity studies to understand the watersheds surface and groundwater budgets

One important facet of increasing capacity is to develop better estimates of how much human development can be supported by the available water supply by conducting water supply and water quality studies. The studies must account for current water uses and supplies in ground and surface waters, also take into account projected changes in precipitation owing to climate change. Groundwater is a poorly understood resource in much of the region. Because of the faulted and fractured geological conditions, it is difficult to describe the sustainable yield or water quality of aquifers. Consequently, there is insufficient information to determine if aquifers are being sustainably managed. Within the region, there are significant diversions of surface water for agricultural and hydroelectric uses. These diversions presumably have an impact on groundwater resources. Most of the

groundwater use in the region is for household purposes. There is growing evidence that in some areas groundwater is being contaminated by leakage from septic tanks or other such sources. Identification of suitable groundwater management practices to prevent contamination and assure that groundwater recharge and extraction are balanced will require more study and analysis.

Objective: Increase means of water storage capacity

Increasing storage capacity is a significant issue for all water agencies responsible for providing a reliable and clean water supply for urban, agricultural and environmental purposes. Improved capacity will consist of a range of strategies that could include capturing additional water supplies, reducing water use through conservation efforts, water recycling, and restoring the natural storage capacity of watershed lands. Additional water supplies could be captured by new storage facilities, raising dam heights, or by removing accumulated sediments. Gains could also be made through conjunctive use; that is, through the coordinated management of surface water and groundwater supplies. There may also be potential for increasing capacity through inter-basin cooperation.

Objective: Reduce unnaturally high levels of water use by non-native plants and negative impacts on native wildlife by removing exotic species and increasing the use of native plants in landscaping

Exotic vegetation typically consumes water at a higher rate than native, drought-adapted vegetation. Giant reed (*Arundo donax*) and tree of heaven (*Ailanthus altissima*) are particularly notorious water users. Conversion of meadows to forests may also contribute to unnaturally high levels of water use by vegetation.

Habitat alteration and loss of habitat has occurred in the region as a result of water diversions, dams, mining, agriculture, grazing, and urban development. This is a consequence of humans using increasing amounts of watershed resources. Disturbances that create bare soil allow opportunities for non-native species, especially exotic weedy plants, to invade and take over native vegetation. These altered areas can then become inhospitable to native animal species, which, in turn creates opportunities for non-native animals to invade. Wherever possible, native habitat should be retained or restored for those native species that evolved in the region.

Objective: Optimize efficient use, conservation and recycling of water resources

Conservation, recycling, and improved infrastructure efficiencies are important tools to meet increasing water demands throughout the region. The water management agencies in the region have experimented with conservation and recycling to varying degrees. The lessons learned and techniques developed can be adopted and implemented by other water management agencies. Increased efficiency in irrigation systems, the use of reclaimed and untreated water, and additional efforts to conserve more water will also be promoted.

Objective: Minimize impervious surface cover and improve infiltration by implementing and encouraging the use of permeable pavements and best practices of land-use.

Land use is changing rapidly, primarily with an increase in residential and commercial development in the small towns and rural areas along road corridors. Housing developments and expanded urban boundaries generally increases the acreage of impervious surfaces with paved roads, parking lots, commercial development, cut slopes and houses. This conversion of land from pervious to impervious conditions reduces the amount of precipitation that can infiltrate or percolate into the soil and into groundwater aquifers, increases and focuses pollutants and increases the rate and volume of runoff. This adversely affects stream channel stability and aquatic habitat.

Objective: Protect and restore connectivity of floodplains, stream channels and groundwater by identifying critical areas for protection and promoting best practices

a mix of steep, confined channel types (with few floodplains and other depositional features) and lower gradient, less confined reaches (with significant floodplain areas and other depositional features) characterizes the Region's Rivers and streams. It is important to river health to maintain connectivity with floodplain areas to sustain riparian habitat and recharge groundwater resources. Streams are a function of the connectivity between geomorphic surfaces (such as floodplains) and stream banks that form the channels that convey the water. Groundwater and water tables adjacent to the stream channels play a critical role in water storage during wet months and water release back into the channels during dry months. (As the water level goes down in streams from spring to late summer, stored water moves back into the channels from the adjacent aquifers to maintain dry season base flows.) The connectivity of these aquatic ecosystem components must be protected or restored in order to maintain a functioning stream system, improve water quality, and reduce fluctuation in water variability.

Objective: Manage land use and landscaping to reduce the risk and the effects of catastrophic fire by creating strategic fuel breaks and conducting fuel treatments and utilizing fire resistant and retardant landscaping

The foothills and mountains of the southern Sierra have evolved to have frequent fires, mostly of small and medium intensity. Fire suppression has dramatically increased fuels. As a result, there is a marked increase in the risk of catastrophic fire. Such fires negatively affect the watershed as well as the developments located there. The impacts of catastrophic fire can range from loss of human life and property damage to water and other infrastructure and ecosystem damage, especially soil erosion and sediment deposition in aquatic habitats. Increased development in the wildland-urban interface increases the costs (property losses) associated with fires. Water delivery systems can be damaged by

fire and result in interruptions in the water supply. Reducing the risk of catastrophic fire will require implementing best management practices to reduce fuel loads. But this action by itself will not be sufficient to address the huge problems that currently exist. It will also be necessary to minimize the intrusion of human and property assets into the high risk fire areas. The risk of wildfire will need to be taken into consideration when planning for the location and design of developments within the wildland-urban interface.

Objective: Manage for climate change adaptation and mitigation

Climate change is accelerated by increasing levels of carbon dioxide and other greenhouse gasses in the atmosphere that lead to warmer global temperatures. Droughts may become more frequent and of longer duration. Precipitation may become more intense and localized, leading to higher risk and incidents of flooding occurring earlier in the wet season (i.e., March/April rather than the usual May/June; increasing the likelihood of rain-on-snow events). Such changes will have significant effects on managing water resources to meet future demand. A drought policy or flood response program based on modeled predictions of climate change effects as well as changing land and water use patterns will provide options for managers to define the best strategies such as: increasing storage capacity at existing facilities, improving infrastructure, increasing water conservation and recycling, and developing additional storage systems. The SSIRWMP will investigate the implications of these changes for water management and develop strategies to adapt to climatic fluctuations. Managing the land to reduce greenhouse emissions and to increase the amount of carbon sequestration will reduce the magnitude of the effects of climate change. Research, monitoring, exchange of lessons learned, and adaptive management will all play a role in our management.

Objective: Reduce water contamination by people and development to meet regional water quality control board standards by promoting best management practices of septic tanks, riparian management and restoration, promoting mine safety and awareness and illegal marijuana cultivation awareness

Best management practices will reduce contaminants contributed from septic tanks, urban storm water runoff, recreation, and other land uses. Improving and maintaining water quality can be achieved through important riparian buffer zones that remove sediments and contaminants carried by runoff. Agricultural runoff can be controlled in a variety of ways with sediment basins as well as riparian buffer strips. The SSIRWMP will take action to remediate abandoned mines to reduce contaminant loading to rivers. Water-related recreation will increase as nearby population centers grow. Illegal marijuana gardens also contribute to water contamination and diversion of water from more productive uses.

Objective: Reduce erosion and sedimentation, and protect and restore riparian, wetland and seasonally flooded habitats by protecting key areas from development with best management practices and cooperative agreements, easements or other

Wetlands and riparian habitats are effective filters and buffers for water quality improvement. Runoff is effectively filtered by riparian systems, and wetlands filter stream flow removing many pollutants. Wetlands and riparian habitats can improve water quality and provide important habitat for aquatic and terrestrial species. The SSIRWMP will implement actions to restore and protect these habitats in the region's watersheds. In addition to improving water quality, best management practices that protect stream-banks and riparian systems can be incorporated into land use and development plans. Eroding water courses, hillsides, and roads all contribute to unnatural levels of erosion and sedimentation. This negatively impacts wetlands, water courses, and the storage capacity of the reservoirs.

Objective: Promote community and regional storm water management plans

Regional water quality basin plans generally require storm water management plans that direct and treat runoff events to some degree. Strategies to reduce and/or treat stormwater have proven to be effective in reducing pollution inputs to water bodies. In the case of small communities that generate low volumes of storm water, riparian systems adjacent to streams can buffer the volume and pollutants entering adjacent streams. Planning is necessary to address the unique situations of every community and to identify the most reliable, cost effective, and dependable actions.

Objective: Promote comprehensive land use planning by providing data, analysis and stakeholder input to land use planning process

As new housing areas are developed throughout the region, additional pressure is placed on water supplies and delivery systems, habitats can be irreversibly altered, groundwater is at greater risk of being depleted and contaminated, riparian systems are removed, and the natural buffering of water quality is diminished. Comprehensive land use planning for new developments in rural areas will not only ensure that those natural features important to water quality and quantity are protected and maintained, but will be integral to planning future water supply and delivery systems.

Objective: Promote community education about water issues by promoting best practices communicating key issues, best practices and accepted techniques in water management

Some of our most intractable problems are directly related to the somewhat unintentional misuse of the region's resources. Community education can be a valuable tool in addressing issues such as trash disposal (littering), residential chemical storage/disposal, unwise landscaping decisions (water intensive vegetation and/or fire-carrying landscaping), and others. Also, a more educated public should result in community awareness (and easier

regulation) of intentional misuse. We have the ability to leverage our educational institutions such as SCICON and others if we set an appropriate goal that they can get behind.

The objective measurement table below (Table) summarizes how the preceding objectives will be quantified.

Table 5. Measurement criteria for the objectives of the SSIRWM Plan.

Objective	Methods for Measurement
Maximize natural storage of water by promoting meadow restoration, stream restoration and floodplain groundwater percolation	• Number of meadows and acres restored • Number of acres/miles of streams restored. • Water temperatures pre-and post restoration • Groundwater level change • Wetland vegetation restoration, increases in native cover and diversity • Number of special status species' habitat improved • Number of acre-feet stored or delayed in runoff
Increase water storage capacity	• Increase in volume of water stored • Number of days of delayed runoff
Reduce unnaturally high levels of water use by non-native plants and negative impacts on native wildlife by removing exotic species and increasing the use of native plants in landscaping	• Number of acres of restored habitat • Number of acres of invaded habitat • Number of sites or acreage where invasive species are removed and native plants are introduced • Number of exotic problems species
Optimize efficient use, conservation and recycling of water resources	• Amount of water used • Number of sites employing native/xeric landscaping • Number of gallons conserved
Minimize impervious surface cover and improve infiltration by implementing and encouraging the use of permeable pavements and best practices of land-use	• Number of permeable surface projects • Acres of permeable surfaces
Protect and restore connectivity of	• Number of critical areas identified

floodplains, stream channels and groundwater by identifying critical areas for protection and promoting best practices	• Number of projects to establish connectivity • Number of key areas protected, acres restored/protected
Manage land use to reduce the risk and the effects of catastrophic fire by creating strategic fuel breaks and conducting fuel treatments	• Number of projects completed • Volume of additional water provided • Number of acres of fuel breaks
Manage for climate change adaptation and mitigation	• Reductions in Greenhouse Gas Emissions • Number of Projects Completed • Number of studies on climate change and GHG's • Number of adaptation strategies employed by managers • Success in implementing adaptation strategies
Establish groundwater management practices by providing key studies in areas where water conflicts arise and by determining best estimates of available groundwater	• Number of groundwater studies completed • Number of new practices implemented • Number of monitoring wells • Coverage of groundwater supply information
Reduce water contamination by people and development to meet regional water quality control board standards by promoting best management practices of septic tanks, riparian management and restoration, promoting mine safety and awareness and illegal marijuana cultivation awareness	• Number of water quality violations • Number of riparian management projects completed • Miles of impaired streams in the Region • Number of impaired water bodies in the Region
Reduce water contamination by livestock to meet regional water quality control board standards by fencing key surface water sources to facilitate grazing control	• Miles of riparian/wetland fencing • Number of water quality violations
Reduce erosion and sedimentation, and protect and restore riparian, wetland and seasonally flooded habitats by protecting key areas from development with best management practices and cooperative agreements, easements or other	• Amount of development that is relocated away from sensitive areas • Acreage of protected lands

Promote community and regional storm water management plans	• Number of stormwater management plans created and adopted
Promote comprehensive land use planning by providing data, analysis and stakeholder input to land use planning process	• Number of land use plans adopted
Promote community education about water issues	• Number of new programs • Number of days of educational activity provided • New materials and dissemination

Appendix IV shows a table that has these objectives further broken down into subcategories that provides detail as to how each objective may be affected by climate change and describes how each fits into the overall State strategy for greenhouse gas reduction as mandated by AB 32. The planning work scheduled for 2013-2015 will build upon this current plan effort, and the objectives will be revised early in the update process so they can be used to guide the identification and selection of projects and the evaluation of resource management strategies.

Chapter 6 - Resource Management Strategies

A range of resource management strategies (RMS) has been considered by the RWMG that were initially established by the California Water Plan. Integrated resource management strategies were developed in three ways:

1. Integrated strategies are a part of the recommendations developed for each substantive chapter of the IRWMP. These were proposed by the RWMG or stakeholders and revised as each chapter is drafted and reviewed;
2. Planning workshops on key issue areas were designed to promote the development of integrated, multi-benefit strategies. This will occur both through the presentation of best management practices in other regions, and through the facilitated discussions following the presentations;
3. Once the Plan has been adopted, integrated strategies may be proposed by individual project proponents for prioritization and funding approval. The prioritization process developed for the consideration of these proposals will include additional points for projects that have integrated strategies and multiple benefits.

Table below shows the full list of RMS's that were considered by the SSIRWMP.

6.1 Resource Management Strategies described by the 2009 California Water Plan

The discussion below includes a description of each RMS, a discussion of whether or how the RMS is currently being pursued in the area, and an evaluation of its applicability and potential for future use.

The Resource Management Strategies of the 2009 California Water Plan have been grouped in to 6 topical areas in Table 6 below. Each category contains the specific strategies outlined in the 2009 Plan. These include:

1. Reducing Water Demand;
2. Improving Operational Efficiency and Transfers of water;
3. Increasing Water Supply;
4. Improving Water Quality;
5. Practicing Resource Stewardship;
6. Improving Flood Management.

1. Reducing Water Demand (RMS 1 and 2) – This RMS category is geared towards reducing water demand by increasing water use efficiency. This applies both to agricultural and

urban water uses. This RMS category is very important to the SSIRWM region as it is one area that the region can improve upon. The water saved by implementing efficiency strategies becomes available for other purposes. This is one focal point that the SSIRWM Plan strongly encourages for lasting regional improvements. Furthermore, reducing water demand is in accordance with the Plan Objective to "Optimize efficient use, conservation, and recycling of water resources."

2. Improving Operational Efficiency and Transfers of water (RMS 3-6) – This category of RMS is designed to improve the efficiency of water that is moved between geographic regions within California. One common example is water exported from the Sacramento – San Joaquin Delta. This RMS category is of slightly smaller importance to the SSIRWM Region because the Region is minimally dependent on water transfers. Rather, the SSIRWM Region is much more focused on regional self-sufficiency. This goal of regional self-sufficiency is also reflected by the fact that the IRWM Plan objectives do not address water transfers or conveyance.

3. Increase Water Supply (RMS 7-12) – This RMS category has some important strategies for the SSIRWM Region, namely, conjunctive management and groundwater storage, increasing surface storage, and recycling municipal water. Desalination and precipitation enhancement are not viable strategies for this region. By increasing groundwater percolation, infiltration, recycling and storage, water supply will be increased in the SSIRWM Region. This is in line with several regional objectives, including: "increase water storage capacity," "maximize natural storage of water by promoting floodplain groundwater percolation," "Improve infiltration by minimizing impervious surface cover," and "establish groundwater management practices."

4. Improve Water Quality (RMS 13-18) – Improving water quality covers several very important Resource Management Strategies for the SSIRWM Region. In a region with limited water resources, it is critical to ensure that the limited amount available is of high and usable quality. Preventing water from becoming polluted, treating appropriately and as-necessary, managing urban runoff, and remediating aquifers and groundwater are critical. These strategies also cover effective water treatment, which is a challenge for portions of the SSIRWM Region with limited financial resources. The Disadvantaged Communities of the SSIRWM Region are trying to find ways to effectively treat water for their community. The importance of improving water quality is reflected in several Plan objectives, including: "Reduce water contamination by people and development," "reduce water contamination by livestock," and "Reduce erosion and sedimentation, by protecting key areas from development."

5. Practice Resources Stewardship (RMS 19-26) – The strategies in this section are about improving and maintaining water and complementary resources and they are perhaps among the most important to the southern Sierra. Agriculture, recreation, forests, urban land uses, and other ecosystems and watershed all have an impact on water resources. By ensuring that these complementary resources are adequately managed the SSIRWM Region is considering the effects from associated land uses. Finally, economic incentives can play an important role for the SSIRWM Region population to practice resource stewardship in contribution to water management efforts. Again, several regional objectives are in play here, particularly focused on complementary resources, "promote comprehensive land-use planning," "promote community education about water issues," "restore riparian, wetland, and seasonally flooded habitats," "reduce the risk and the effects of catastrophic fire," and "maximize natural storage of water by promoting meadow and stream restoration."

6. Flood Risk Management (RMS 27) – This is a strategy intended to reduce the negative impacts of floods and to better manage the additional water that comes with storm events. This includes projects that help communities and individuals during times of flood. Flood risk management also includes both structural and nonstructural measures that offer benefits to floodplains and minimize damage to human development. This is of moderate importance to the SSIRWM Region; the region is focused on habitat protection and enhancement during floods, stormwater management, and land use designations to prevent development in sensitive floodplain habitat, and surface cover to aid in stormwater management.

Table 6. Resource Management Strategies identified in the California Water Plan.

Reduce Water Demand
1. Urban water Use Efficiency
2. Agricultural Water Use Efficiency
Improve Operational Efficiency and Transfers
3. System Reoperation
4. Conveyance - Delta
5. Conveyance - Regional/local
6. Water Transfers
Increase Water Supply
7. Conjunctive Management and Groundwater Storage
8. Desalination
9. Precipitation Enhancement
10. Recycled Municipal Water

11. Surface Storage – CALFED
12. Surface Storage – Regional / Local
Improve Water Quality
13. Drinking Water Treatment and Distribution
14. Groundwater Remediation/Aquifer Remediation
15. Matching water Quality to Use
16. Salt and Salinity Management
17. Pollution Prevention
18. Urban Runoff Management
Practice Resources Stewardship
19. Agricultural Lands Stewardship
20. Economic Incentives
21. Recharge Area Protection
22. Watershed Management
23. Ecosystem Restoration
24. Forest Management
25. Land Use Planning and Management
26. Water Dependent Recreation
Improve Flood Management
27. Flood Risk Management

For the SSIRWM region, some of the objectives are more important than others. This RWMG focuses ecosystem restoration and protection efforts and sustaining water supply for communities. These are the most pressing needs and strategies in the Region. Also, increasing water supply is not easily implemented because the regional waters are completely appropriated, but reducing demand and increasing efficiency may be effective strategies. Thus, reducing demand may be a higher immediate priority for the SSRWMG, however, it is important to note that several large landowners may be willing to sell or lease water rights to provide an additional supply. Therefore it is worth pursuing the .

As a result, the SSIRWMP has established the following goals for implementation. The tables in Appendix IV show the ideas of the SSIRWMP. These tables also mention some of the anticipated climate change impacts for each goal and objective.

6.2 Overall goal for Plan implementation

The IRWM planning process is being developed in such a way that it will promote successful and sustained implementation of the resulting Plan. Specific strategies include:

i. Address regional and local issues, achieve goals and objectives and implement resource management strategies.

ii. Sustainability of effort –The Southern Sierra region is multi-jurisdictional so there is no one agency which would be the obvious entity to oversee the implementation of the Plan. The process is therefore being designed such that stakeholders from the multiple agencies provide time and effort throughout the process. In fact, such participation has already been established over the past four years through the activities of the Planning and Coordinating Committees. This ensures the buy-in and institutionalization of the IRWM effort within these regional agencies. The process is also being designed to provide value to these agencies so that their contribution of staff time is considered a worthwhile investment.

    The planning process is also designed so that the leadership and day-to-day project management comes from local entities. Planning firms will only be used for technical tasks. This also helps institutionalize the effort within the local entities which can continue to provide leadership to the RWMG in the future.

iii. Capacity building – The process includes many opportunities for regional entities to increase their capacity to develop and implement projects. These include the educational workshops, and the hands-on involvement in reviewing Plan chapters and strategies, all of which will build knowledge of problems, issues, and effective solutions.

iv. Collaboration – Many opportunities are provided during the planning process for stakeholder agencies and organizations to have positive contact with one another and to share information and concerns. These opportunities have already begun to take place during the development of the IRWM structure and planning strategies over the past two years, and will be continued during the proposed two year IRWM Plan development process. In addition, the planning process encourages and facilitates involvement by community stakeholders. The communication, familiarity and trust - already started over the last four years - will be strengthened during this process which will help avoid unnecessary and destructive polarization and will promote positive resolution of issues and conflicts should they arise.

Updating this chapter includes an updated critical review of the 32 RMS's identified in the California Water Plan. The Plan will include a description of each RMS, discussion of whether or how the RMS is currently being pursued in the area, and an evaluation of its applicability and potential for future use. The effort will encourage members to use applicable new RMS's to help the region diversify its water management abilities. In

addition, each RMS will be evaluated for how it may be affected by climate change, and how each fits into the overall State strategy for greenhouse gas reduction as mandated by AB 32.

During planning activities scheduled to begin in mid-2013, the planning firm writing the plan will review the current strategies and identify a range of new or updated strategies that could be used to meet IRWM objectives and identify which RMS should be incorporated into the IRWM Plan and update and synthesize the information in the inventory of local water and land use plans and incorporate any new information into the Plan. The RWMG already compiled, analyzed and identified data gaps in a great number of plans and studies. New information from documents such as Tulare and Fresno County general plans, Sequoia and Kings Canyon National Parks General Management Plan, Sierra, Sequoia and Inyo national forests forest management plans will be incorporated into the Plan. The Plan can in turn provide information, recommendations and strategies for land and water use planning as well as flood management.

This a critical component of the planning efforts for the SSIRWM region because an important consideration in the region is the relationship between land use and water quality, quantity and runoff timing for surface water.

Because there are no incorporated cities in the SSIRWM region, public utility districts, resource conservation districts and community service districts will be critical for local water planning and for providing additional information about water and land use in rural and hamlet areas of the region.

Chapter 7 - Project Review Process: Solicitation, Identification, Prioritization

The purpose of identifying projects in the IRWM Plan is to understand the needed action to meet the IRWM Plan objectives. Projects will not be prioritized based on any specific grant program. The project selection process has two phases:

1. Identify projects that will be necessary to implement the IRWM Plan; and
2. Identify projects that may qualify for a specific funding source.

The IRWM Plan documents the project review process and demonstrates that the process meets DWR's standards. To date, the SSIRWM Region has not developed a project review process. This chapter formulates the process and will provide the necessary sections of the IRWMP.

The intent of the Project Review Process is to ensure the process used for submitting, reviewing, and selecting projects is documented and understandable for regional stakeholders and the public. The process is intended to produce a list of prioritized implementation projects sufficiently developed and demonstrating appropriate need that can be funded through the IRWM Grant program or other funding sources.

This is the process to be used for soliciting, submitting, reviewing, and selecting projects. The SSRWMG process includes four components:

1. Procedure for identifying and soliciting projects
2. Procedure for submitting a project to the IRWM Plan
3. Procedure for review of projects to implement the IRWM Plan
4. Procedure for communicating the list(s) of selected projects

The projects included in the IRWM Plan are the projects that will implement the Plan and achieve the Plan objectives.

The project implementation workgroup/subcommittee or the coordinating committee are responsible for providing/recommending the process, reviewing projects and project lists for approval in the Regional Water Management Group.

Stakeholders may provide input during the submittal, review, selection process to develop the project list include procedures for submitting projects to be considered for inclusion into the IRWM Plan. By participating in public meetings or workgroups, submitting comments to the facilitator or other designee, the stakeholders and public may contribute to and comment on the process and products of the implementation program.

The RWMG updates the project list and accepts project ideas on an on-going basis. New projects do not require re-adoption of the Plan. The most important times for project submittal are in coordination with DWR timeframes for implementation grants, but the RWMG may seek funding from other sources for important projects.

7.1 Identifying and Soliciting Projects

The RWMG has identified a great number of projects through collaborative, regional public meetings since 2008 and a public survey in 2009. Regional stakeholders brainstormed projects and stakeholders were asked to complete a survey.

The RWMG will formally and informally solicit projects during application stages (when funding sources have been identified preparations are underway for a grant application), but stakeholders are encouraged to submit projects and project ideas at any time. Formal solicitations will be in the form of official emails, posting flyers in public places, public presentations to town halls and board meetings. Informal solicitations are communications such individual emails and phone calls.

7.2 Submitting a Project for Inclusion in the IRWM Plan

Project submittal requires standardized information the project proponent will provide to the RWMG so each project will have the necessary information for the review process.

SSRWMG's approach is to work with the stakeholders in the SSIRWMP Region to identify potential projects, plans, and policies that may be included in the IRWMP. Project proponents will have adopted the IRWMP. Project identification will require proponents to address the criteria, and to complete Project Description Form (see attached form Appendix V). This application will include project information regarding:

- Sponsor
- Relationship to SSIRWMP
- Purpose/Need
- Partnerships
- Integration and Multiple Benefits
- Scope of Work (i.e., schedule, tasks, and deliverables)
- Technical Analysis and Data Management
- Financing
- Relevance to State-wide priorities

Project proponents and stakeholders are encouraged to submit and develop ideas for projects at any time. The RWMG will designate appropriate deadlines for each additional funding source application. Bringing projects to the planning table at committee or RWMG meetings may provide additional technical guidance, funding sources and integration to

project proponents. Disadvantaged communities may apply for planning funding to address potential projects so that the plans and designs will take these concepts and ideas to fully developed implementation projects. The RWMG seeks to assist all project proponents, especially disadvantaged communities, in developing project ideas and concepts.

7.3 Review of projects considered for inclusion into the IRWM Plan

The review process must include multiple factors and should be designed to select based on more than readiness to proceed. At a minimum, the factors listed below must be included to qualify for DWR funding:

1. *How the project contributes to the IRWM Plan objectives*
   It is important to be able to measure how an objective is being met through projects. The projects must relate to the achievement of the IRWMP objectives by providing progress towards the plan objectives.

2. *How the project is related to resource management strategies*
   The IRWM Plan identifies resource management strategies that diversify the water management portfolio used to meet plan objectives.

3. *Technical feasibility of the project*
   The RWMG needs to consider the technical feasibility of the projects. Technical feasibility is related to the knowledge of the project location; knowledge of the water system at the project location; or with the material, methods, or processes proposed for the project. Project proponents must provide information about the geologic conditions, hydrology, ecology, or other aspect of the system where the project is located. There may be data gaps that must be addressed in order to implement the project. The project proponents will also need to provide enough information to ensure that the project methods are appropriate and can ensure success. Project success is the realization of a planned benefit. Project proponents will need to ensure that the on the ground conditions match the methods and accurately predict quantities (such as recharge, stream miles, acres treated, etc) in the project.

4. *Specific DAC water issues benefits*
   Projects that help address critical water supply and water quality needs of DACs within the IRWM region will be promoted in the project selection process (CWC §10540.(c)(7) states that identifying and consideration of water-related needs of DACs in the area within the boundaries of a region is among the basic items an IRWM Plan must address). DAC's may apply for funding to prepare a project such as a needs assessment, initial engineering work (design or study) to define a project, or feasibility.

5. *Specific benefits to critical water issues for Native American tribal communities*
   The project review process will consider if the project helps to address critical water supply and water quality needs of Native American tribal communities within the IRWM region. Tribes may apply for funding to prepare a project such as a needs assessment, initial engineering work (design or study) to define a project, or feasibility.

6. *Environmental Justice Considerations*
   The project review process will consider environmental justice needs in the IRWM region. Important considerations for IRWM are inequitable distribution of pollution and access to clean water and air, parks, recreation, nutritious foods, etc. This requires willing awareness of impacts and benefits by project sponsors and participation in decision making by affected environmental organization.

7. *Project Costs and Financing*
   Project costs need to be considered during the project review process. The basis for the project costs needs to be documented. Projects may be based on a conceptual idea, feasibility study, partial design, etc. The IRWM Plan will link existing cost estimates and financing with project ideas and studies. Project proponents will discuss the funding sources for the project and identify the funding program, and source (i.e. state, federal).

8. *Economic Feasibility*
   As part of the project review process, the economic feasibility of a project will be considered. DWR's "Economic Analysis Guidebook" (Guidebook), published in January 2008, outlines methods for economic analysis for water resources planning.

   A preliminary economic analysis will be a part of the criteria in the project selection process. An original assessment of the proposed project or studies conducted within the past five years as either a cost-effectiveness or benefit-cost analysis may be used for the preliminary assessment depending on the nature of the project.

9. *Project Status*
   In reviewing projects for prioritization in the IRWM Plan, the RWMG will consider the status of the project, or its readiness to proceed. Conceptual projects will also be included IRWM Plan because the planning horizon for an IRWM Plan is 20-years. Projects with low readiness may be developed or the RWMG may seek additional funding in order to develop the project to be ready.

10. *Strategic considerations for IRWM Plan implementation*
    Any efficiency or leverage that might be gained by combining or modifying local projects into regional projects will be considered in project prioritization. Strategic aspects of plan implementation such as:

- Restructuring projects for greater integration
- Purposefully meeting project goals with an alternative project/modified project
- Plan objective priorities
- Implementing regional projects
- Restructuring projects for multi-benefits

The RWMG will review strategic considerations that may bring multiple benefit and greater integration to projects. In this way, local projects may be integrated for regional benefit and explaining when a single purpose project needs to be implemented in order to best implement an IRWM Plan.

11. *Contribution of the project in adapting to the effects of climate change*
    In developing the picture of water management issues over the planning horizon, the RWMG will include potential effects of climate change on their region and consider if adaptations to their water management system are necessary.
12. *Contribution of the project in reducing GHG emissions as compared to project alternatives*
    The IRWM Plan spans a 20-year planning horizon. The RWMG will consider a project's ability to help the IRWM region reduce GHG emissions as new projects are implemented. Considerations such as energy efficiency and reduction of GHG emissions are important when choosing between project alternatives.

These factors are included in the SSIRWMP project ranking matrix (see Appendix VI).

7.4 Procedure for communicating the list(s) of selected projects

The IRWM Plan will contain the product of the project selection process, the project list(s). The project lists will be extensive and change over time. The plan will contain a link to the website URL where the active project list will be housed.

Chapter 8 - Projects

The SSIRWMP projects can be grouped according to the type of project including: best management practices, studies, plans, demonstration projects, disadvantaged community and tribal projects, and restoration and other projects. There are three tiers of projects: The first tiered projects are ready or nearly ready to implement, there are existing project proponents and the project descriptions have been developed. Second-tier projects have a project proponent but are not ready to implement and have very little detail in the project descriptions. Third-tier projects are project ideas and concepts that may not have a project proponent and the details of the projects have not been identified. Project ideas and concepts will require considerable work to bring to implementation readiness. Where possible, details of project concepts and ideas, such as geographic locations, were provided.

Table 7. Tiered list of implementation projects.

TIER 1 PROJECTS			
Project Category	**Project Title**	**Project Proponent**	**Project Description**
Studies			
	Big Meadows Project	Sequoia National Forest	The Big Meadows Project on Sequoia National Forest documented water table rises and flood attenuation, retention of cold-water environments, positive avifauna and arthropod responses to restoration.
	Forest Service Data Synthesis	Forest Service	Synthesize existing Forest Service data for the Sierra and Sequoia National Forests on small stream discharge to better estimate water yield from un-gauged streams. This synthesis would enable better estimates of current water yields from headwater streams in the southern Sierra Nevada. This would be very low or no cost and might be able to be added to one of the proposals already in progress.
Disadvantaged Community Projects			

	Treated Effluent Discharge to the Tule River Study	Springville Public Utility District	This project is composed of two phases. The first phase is a study to ready the project, including CEQA biological and hydrological studies and project development and integration. The second phase of the project is comprised of finalizing the designs and implementing the project.
Restoration and Other Projects			
	Mill Flat Creek Watershed Restoration	Sierra National Forest	Implement proposed Watershed Improvement Needs Inventory (WINI) projects that have been identified within the Mill Creek watershed, including replacement of culverts to allow for aquatic organism passage and the recommended closure, (decommissioning) of several user created and maintains level 1 and 2 roads.
TIER 2 PROJECTS			
Project Category	**Project Title**	**Project Proponent**	**Project Description**
Studies			
	New Auberry engineer report/studies	New Auberry Water Association	This study project consists of an engineer's report required to update the water system in New Auberry. Without this report, the New Auberry Water Association cannot apply for grants to support additional operations and system improvements.

			A modeling exercise to evaluate whether forest fuel reduction and/or restoration activities result in an increase or no change in water yield from small watersheds. Data to parameterize model(s) is available from KREW. The thinning and burning treatments are ongoing and can provide data to verify model results in the next 1-2 years. UC Merced is already in the process of parameterizing one model with KREW data. Forest Service would supply data but there would be a cost for modeling.
Plans			
			Prioritize meadows for restoration on the Sierra, Sequoia, Inyo national forests, Sequoia and Kings Canyon National Parks
Tribal Projects			
	Tule River Tribe water supply needs		Tule River Indian Reservation has identified a need for a reliable supply of water. It has negotiated it's water rights and taken steps to implement water supply solutions including the potential for a new dam or other impoundments of surface water.
Restoration and Other Projects			
			Watershed protection through protection from development, by voluntary conservation easement especially in the Tule River Watershed, Deer Creek the Kaweah River, Kings River and other flood prone areas in order to protect water quality
	Osa Meadow, Kern Plateau/Kern River Watershed Project		This proposed project would restore approximately 80 acres of meadow through restoration of Osa Meadow.

			Promote use of sustainable gardening practices to reduce pesticide use. Use native plants in landscaping. Compile preferred list of fire and drought resistant/tolerant plant species.
TIER 3 PROJECTS			
Project Category	**Project Title**	**Project Proponent**	**Project Description**
Best Management Practices			
			BMPs for residential pesticide use in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities.
			BMPs and educational materials for septic tank maintenance in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers (has an existing program and information), Springville, Posey, and White River communities
			BMPs regarding fire clearance in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities
			BMPs for flood control and flood management/riparian management along the San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River
			BMPs regarding preventing sedimentation and erosion in headwaters in the San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River watersheds
			BMPs regarding well maintenance and monitoring in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities
			BMPs to promote grazing practices, cattle ponds and riparian areas along San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River

			BMPs to identify land use to minimize environmental impact (cluster development) Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities
Studies			
			Assess and document options and needs for water storage infrastructure. This can be water recharge as well as storage in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities
			Study to identify the impact of riparian septic systems on water quality and a feasibility study for sewers to replace them in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities
			Design a study that will determine the availability of water in the fractured rock system - hydrologic capacity in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities. Provide a uniform approach to data collection and analysis, methodology, results and recommendations.
			Monitor wells for quality and quantity in Auberry, Prather, Squaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River communities. Compile all data sets on one table, e.g. nitrates, radon, Uranium, salts etc.
			Quantifies positive and negative effects to stream ecosystems from forest restoration and fuels reduction activities at the watershed scale. It focuses on water yield and water quality in headwater streams of the Kings River watershed and would contribute to the continuation of data collection and analyses that have been ongoing for 10 years.
Plans			

			Watershed management plans in the San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River watersheds
			Habitat Conservation Plans - Synergize existing efforts and plans regarding habitat conservation
			Studies and plans to prioritize oak woodland sites for protection in the San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River watersheds
Demonstration Projects			
			Meadow restoration – has been complete at Big Meadows and multiple locations on the Sierra National Forest
			Fuel management for fire safety and water production
			Invasive species removal (Arundo, Tamarisk, Scarlet Wisteria) along the San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River
			Total exclusion of development from certain sensitive watersheds such as Deer Creek, White River
			Flood control projects (floodplain, etc.) that have multiple benefits (habitat, water quality, groundwater recharge etc.);
			More detailed vegetation mapping throughout the region
			Integrated strategies for increasing water supply in Shaver Lake, Auberry, PratherSquaw Valley, Dunlap, Badger, Three Rivers, Springville, Posey, and White River
			Native plants (fire resistant/drought tolerant) in public and private landscaping
			Riparian protection through fencing, grazing rotation, additional water distribution systems.
Restoration and Other Projects			

			Invasive Species: remove tamarisk, Arundo donax, along the San Joaquin River, Kings River, Kaweah River, Tule River, Deer Creek, White River and Kern River
			Water retention on grazing lands---RDM standards/BMP's--- relocate water sources for livestock to conserve riparian zones. Control, don't exclude, grazing
			Establish "certified" habitats, i.e., documented foraging and nesting habitats that are managed without pesticides.

Chapter 9 - Integration

The RWMG will develop structures and processes that provide opportunities to foster integration. The development of the Plan itself will establish a framework and collaborative process to foster project integration. Integrated regional water management planning solicits the input and expertise of various groups, including National Forest Service and National Park Service, the local and regional water agencies, flood control agencies, local planning entities, conservancies, public utility districts, business organizations, tribes, open space and recreation interests, and habitat preservation interests. One of the benefits of this planning process is that it brings together a broad array of groups into a forum to discuss and better understand shared needs and opportunities in the region. It also ensures that an extensive range of expertise is used to evaluate projects and identify means to improve and integrate projects.

This section of the plan will explore opportunities for integration that may result from the USFS's new National Forest Systems Planning Rule and other planning processes and projects.

The Southern Sierra is a rural Region characterized by a multitude of land management agencies. These agencies include the Forest Service (Inyo, Sierra and Sequoia National Forests and Sequoia National Monument), the National Park Service (Sequoia and Kings Canyon National Park), Tribes (Tule River Indian Reservation, Big Sandy and Cold Spring Rancherias), Counties (primarily Fresno and Tulare), resource conservation districts (Sierra and Tulare County Resource Conservation districts) and non-profit entities (Sequoia Riverlands Trust) and private landowners. From the earliest Planning Committee meetings, the RWMG recognized that the IRWM Planning process should focus not only on specific projects for implementation, but also on ways to bring the agencies together to increase the effectiveness and identify potential synergies of their management efforts. Of course, the region's stakeholders are eager to have access to implementation funding for their projects. But it is recognized that the region could also benefit greatly from improved relationships, data sharing, collaboration, and development of regionally consistent land use and resource management policies.

To this end, the Planning Committee and other stakeholders brainstormed a list of strategies to improve integrated management within the region. These strategies fell into three categories:

> Category 1: Build effectiveness of regional planning by identifying possible synergies and increasing capacity for collaboration, public involvement, and integrated strategies;
>
> Category 2: Maximize data collection, management and sharing;

Category 3: Conducting, designing and supporting studies and research.

A survey was developed and administered to Planning Committee members as well as other stakeholders (including staff from counties, agencies and other entities) who did not generally attend Planning Committee meetings but who clearly had an interest in the outcome. Respondents were asked to rate each strategy as Urgent (3 points), Important (2 points) or Nice (1 point). The results were as follows: (priority strategies in each category are highlighted)

Table 2. Integrated Management Strategies for the SSIRWM Region.

Category 1. Build effectiveness of regional planning by increasing capacity for collaboration, public involvement, and integrated strategies.			
Avg.	*# responses*	*Points*	*Strategy*
2.59	17	44	Find ways to bring the resource management agencies and organizations together to share data and information and to work collaboratively on policies, plans and projects.
2.31	16	37	Provide examples of best practices, technical assistance and training that furthers the implementation of multi-benefit/integrated management strategies.
2.12	17	36	Assist stakeholder agencies in improved outreach, public education and stakeholder involvement by providing forums for public discussion, e-mail notice lists, etc.
1.75	12	21	Construct data base showing all CEQA/NEPA documents in process, (example: USFS Schedule of Proposed Actions (SOPA)). Create notification system that will filter project by type, region, etc. that automatically will send out notices to interested stakeholders.
2.29	14	32	Help frame a cumulative effects analyses for the region which can streamline the process and enhance the value of the analysis for everyone. (Cumulative Watershed effects model analysis for the region)
2.11	9	19	Identify beneficiaries of region's ecosystem services/benefits. Engage in outreach and education to the beneficiaries to increase the likelihood that they will contribute to watershed health.
1.67	6	10	Education on legal issues
1.50	6	9	Develop curriculum/training program
Category 2. Maximize Data Collection, Management and Sharing			
2.29	14	32	Create a web portal with links to all planning documents and studies for the region.
2.08	13	27	Synthesize interagency databases from existing agency sets (e.g., South Sierra Geographic Information Coop)
2.36	14	33	Put together baseline watershed conditions for purposes of climate change,

			etc.
Category 3: Studies and Research			
2.53	17	43	Assess hydrologic capacity of region - amount of water available in fractured rock system.
1.93	15	29	Assess options for water storage infrastructure where needed.
2.07	15	31	Assess small system water quality problems and provide feasibility analysis for corrective actions.
2.00	15	30	Study the impact of septic systems on water quality

The results from this survey are integrated into this Plan, the process by which the plan was developed is designed to promote the priority strategies identified above. Some of the priorities identified were not appropriate for the IRWM scope of work (e.g., Assessing small system water quality problems and providing feasibility analyses for corrective actions). Other items can only be partially addressed through the IRWM resources. The Planning Committee/RWMG has identified some possible other sources of funding to address these priorities and will continue to seek resources to meet these priority items.

During planning activities scheduled to begin in mid-2013, the planning firm in conjunction with the RWMG will develop structures and processes that provide opportunities to foster further integration.

Chapter 10 - Plan Performance and Monitoring

This chapter outlines a management plan for monitoring responsibilities, reporting procedures, data management, and general criteria for project-specific monitoring plans including both qualitative and quantitative metrics as appropriate.

10.1 Monitoring Responsibilities

There are a number of organizations which already monitor various aspects of the ecosystems in the southern Sierra. Various public agencies and non-profit organizations measure variables such as water quality and quantity, usage, wildlife and aquatic animal species, and others. In the next chapter, data management plan for the region is outlined with existing tasks, timing and the responsible agency (See Table 3).

Agencies collecting data on water quality, quantity, land management activities, planning and implementation results will monitor project-or issue-specific metrics. The data will be utilized to provide reports for grant administration and tracking, and will be compiled annually to update the RWMG and will be included in future plan updates.

In order for specific components of the plan to be monitored, the planning firm will develop a management plan for monitoring responsibilities, reporting procedures, data management, and general criteria for project-specific monitoring plans including both qualitative and quantitative metrics as appropriate during planning activities scheduled to begin in mid-2013. The plan will also prescribe a procedure for communicating lessons learned to RWMG members and incorporating them into the Plan updates.

Chapter 11 - Data Management

The Southern Sierra Region is a large, remote area with no incorporated cities. There is no one agency or entity collecting, analyzing, storing or making accessible data for the entire region. Many watersheds or parts of entire watersheds are without roads or other infrastructure. Thus, data management in terms of collecting, analyzing and making accessible is very challenging. The Southern Sierra RWMG is composed of multiple jurisdictions, agencies, non-profit groups, tribes and communities therefore, data management is key in disseminating the information and research the RWMG gathers. The multiple jurisdictions often do not use the same methods of data collection, analysis and storage.

For example, assessing the ground and surface water, a key data gathering area the RWMG has continually emphasized, will provide a variety of qualitative and quantitative information. Individual projects will also need to be monitored and assessed throughout the process, generating data. 'Data sharing for efficient and effective management' was one of the priority strategies which emerged from the stakeholder survey on 2009 and 2010. A preliminary data management plan for planning and implementation in the region will be needed to further develop the inventory of existing data, and identify gaps to develop a set of next steps and recommendations (see Table 8).

11.1 Process for Collecting, Analyzing, Managing and Accessing Data

The RWMG utilized the available plans, reports and studies collected since 2008 as a basis for the IRWM Plan chapters, including background, key issues, and recommendations. The Coordinating Committee and the RWMG reviewed this work to make sure that the conclusions match the data. Where necessary, technical advisory committees will be convened to oversee the use of data in specific issues areas, including:

1. Quality of data used,
2. Methods of analysis, and
3. Comprehensiveness of sources.

There are several important data management planning, analysis and use efforts underway or recently completed in, or adjacent to, the SSIRWM region. . The California Water Institute at CSU Fresno will be the repository for all data for the funding region, including the SSIRWM region. Data will include GIS information that can be spatially displayed and applied. The Tulare Basin Watershed Initiative will also house a great deal of information on projects, plans, socio-economics, ecosystem preservation and coordination data among the various IRWM groups in the Tulare Lake Funding Region. Tulare County is also gathering data for water quality issues in Tulare County and the SSIRWM region will need to coordinate with the County to leverage opportunities for data collection, avoid

duplication of efforts, and identify data that can be used in the SSIRWM next plan development process. This DAC process pilot study is currently underway. USFWS through its Landscape Conservation Cooperatives as well as other federal agencies such as the US Forest Service and National Park Service and the Bureau of Land Management will have and house numerous data sets. Data will be in the form of GIS data, layers and maps as well as data that is raw and has not been analyzed. The Sierra Nevada Conservancy houses a significant amount of GIS and other data that will be important to incorporate in future planning efforts as well as in the implementation program. It will be important to gain access to all possible datasets and to seamlessly integrate them across jurisdictional boundaries. This will greatly enhance communication, regional analysis, interagency collaboration and regional and inter-regional integration.

Table 3. Data management plan summary.

Description	Lead Roles and Responsibilities	Time Frame	Status
Data Management			
1. Develop and Implement Regional Data Management System	RWMG, stakeholders	Mid-term	Future task
2. Expand Regional Data Management System and create data portal	RWMG, stakeholders	Near term	On-going
3. Continue and update website	SRT/RWMG	Immediately	On-going
4. Continue to gather plans and studies	RWMG	Mid-term	On-going
Monitoring, Measuring Plan Performance			
Fishery monitoring program	DFG, USFS, NPS, Watershed Coordinators	Near term	On-going.
Water Quality Monitoring.	DFG, USFS, NPS, Watershed Coordinators, local districts, Sierra RCD, landowners	Near term	On-going.
Water quantity data – surface and groundwater	Three Rivers CSD, Sierra RCD, Watershed coordinator, USFS		

Conduct data network evaluation and develop regional monitoring plan	RWMG, stakeholders	Mid term	Future task
Water issues and projects report	RWMG, stakeholders	Mid term	Future task

11.2 Data Needs List

Further data collection, storage and analysis will be needed for the region to enhance the water management portfolio and increase data accessibility for further stakeholder synthesis and analysis and to increase water managers' data knowledge and integration will further promote integration, collaboration and management across multiple jurisdictions.

1. Data Collection - Very little groundwater information is available and accessible for resource planning in the region where fractured bedrock aquifers serve remote, disadvantaged communities through individual wells and septic tanks. There are no incorporated cities and only small water treatment plants and the majority of the region utilizes wells and septic tanks. County general plans call for development in the foothill and mountain communities yet sustainable use rates have yet to be established for existing communities who rely almost exclusively on fractured-rock aquifers. The region is supported by a small number of public districts, including Three Rivers Community Services District, Springville Public Utilities District, several small water associations, many private ditch companies, two resource conservation districts and two resource conservation and development councils.

2. Data Analysis
   The RWMG will provide maps and data in a format that will elucidate regional and local trends, strategies, issue and problem sources and solutions. Data analysis may integrate data from several scales or perspectives to highlight trends or conditions.

   The California Department of Water Resources agreed to partner with the RWMG to provide and make useable existing data and potentially provide additional technical assistance with ground and surface water data as well as data about geology, land use, best management practices, etc.Data generated in this work will be applied to the California Water Plan, where very little information currently exists about the region. This process incorporates the initial findings of Sierra Resource Conservation District's Phase I study of groundwater in the San Joaquin River Watershed.

3. Data Storage and Accessibility
   Data storage will occur on the Sequoia Riverlands Trust website with regular updates.

This location, along with regular RWMG updates, will house large resolution watershed maps, studies and plans, and the historical RWMG documents. In order to provide data access for the Region, the RWMG will need to ensure that data is in readily-accessible formats or provide appropriate graphical elements in order to facilitate access. The data will also need to be in similar or compatible formats. A data management system will need to be developed to incorporate all of the data, integrate the existing plans and studies, provide analysis tools and store all of the information.

11.3 Recommendations and Strategic Data Management Actions

There are a number of data collection, storage, analysis and accessibility recommendations that emerged since 2008 in the Region.

1. On-going Website Improvements and Maintenance – The existing SRT website will continue to be the location of information on the process, providing information about the process, drafts of Plan chapters as they are prepared, and electronic versions of the background studies and reports on which the Plan is based. This data management strategy will increase stakeholder knowledge and facilitate access to data to build the efficiency and effectiveness of other planning efforts for the region. The website will also include:

    a) A description of the IRWM Planning and Implementation processes;
    b) A calendar of meetings and events related to the planning process and to other IRWM issues;
    c) Educational presentations on the IRWM effort and other related issues;
    d) A database of documents and studies linked to the IRWMP (citations and references).

    The grantee for planning (Sequoia Riverlands Trust), project staff and/or consultants will be responsible for maintaining and updating the website.

2. Data Management Planning and Process - The process for collecting, analyzing and managing technical information is very important to the SSIRWM region. The SSIRWM planning process proposes a multi-level strategy in this area:

    a. On-going Collection of Existing Plans and Studies – The SSRWMG has already collected and summarized many existing plans and studies pertaining to region. These plans will continue to be identified, collected and summarized during current and future IRWM planning process, implementation of the plan and going forward and the information provided on the Plan website.

b. Assessment and design/scope for a comprehensive data management and analysis tool. This task involves assessing stakeholder needs for an on-line data management tool to capture and analyze current conditions and cumulative project impacts on a major watershed basis within the region and evaluating the databases of the Forest Service and National Park Service, for example, ClimDB and HydroDB with stream discharge and precipitation data for long-term research areas. The implementation of such a data management and analysis tool will be a complex task and will require both resources and time that exceed the IRWM Planning process. The IRWMP process could:

- Analyze current models for relevance to local needs, including the Forest Service's Cumulative Watershed Effects tool and the NSF's data library for the National Science Foundation's Southern Sierra Critical Zone Observatory based out of UC Merced;
- The SSIRWMP area contains the only long-term research in the southern Sierra Nevada to comprehensively evaluate modern practices for forest restoration on the physical, chemical, and biological attributes of headwater streams and their associated watersheds. Both mechanical thinning and prescribed fire are being evaluated using a paired-watershed design with controls. KREW has instrumentation on 10 headwater streams and maintains four meteorology stations. Data collection stated in 2002. Thinning treatments were completed in 2012, and fire treatments will occur in 2013-2014. KREW is also useful for evaluating climage change effects and hosts part of NSF's SSCZO;
- Develop and implement a user assessment to determine the most critical utilities and characteristics of such a system; and
- Develop a scope of work for the design and implementation of this tool. This scope of work and design will be presented to the Planning Committee and other key stakeholders for review and approval.

The outcome will be a project design and scope which has been vetted with key stakeholders and is ready for funding applications. This will be a valuable tool in the implementation of the IRWMP in that it will promote the integration of management efforts across issue areas and among the multiple management entities within the region.

3. Data Collection – additional data will be collected on groundwater and surface water quality and quantity as well as on fisheries management
    a. Focused study on groundwater in Three Rivers;
    b. Water quality monitoring in the watersheds.

In order to develop the data management plan for planning and implementation going forward in the region, the planning firm will work with the RWMG to develop an updated inventory of existing data, and identify gaps to develop a set of next steps. The planning firm will need to determine if further data gathering, storage, analysis and accessibility are required during or after planning and how this will be accomplished.

Chapter 12: Technical Analysis

This chapter includes an evaluation of the technical information, methods, and analyses used to understand the water management needs of the SSIRWM Region over the 20-year planning horizon. The focus will be on technical information that is: 1) regional in nature; and 2) necessary for the development, improvement, or enhancement of the IRWMP. A brief description of the technical information sources and/or data sets used to develop the water management needs and the adequacy of the technical information and how such studies, models, or technical methodologies aid the understanding of the region's water management picture.

12.1 Technical Data Sources

Regional Sources:

- National Park Service General Management plans – Sequoia and Kings Canyon National Parks lie within the SSIRWM Region. These parks contain the headwaters for all of the rivers in the region except for the White River and Deer and Poso Creek. The General Management Plan describes the conditions of the Parks and describes and prescribes management actions.
- National Forest Service Forest Management plans – parts of Sequoia, Sierra and Inyo national forests lie within the SSIRWM Region
- Sierra RCD's Phase I study on groundwater in the San Joaquin River Watershed
- Groundwater Studies – Oakhurst and Auberry fractured bedrock aquifer studies
- DWR climate change handbook
- The Southern Sierra Partnership, a partnership between The Nature Conservancy, Sequoia Riverlands Trust, Sierra Business Council and California Audubon seeks to plan and implement climate-adapted conservation strategies through its climate adaptability analysis. Subsequent work will provide significant data in this realm

Sources necessary for the development, improvement, or enhancement of the IRWMP:

- Forest Service and National Park Service hydrology, geomorphology, and water quality data;
- USGS – hydrological and geological data for the region;
- DWR - hydrological and geological data for the region;
- Fresno and Tulare County General Plans;
- USACE storage and land plans;
- Local district plans and needs;
- Minutes from regional water management group meetings, coordinating and subcommittee meetings;
- Stakeholder surveys;

- The Southern Sierra Partnership, a partnership between The Nature Conservancy, Sequoia Riverlands Trust, Sierra Business Council and California Audubon seeks to plan and implement climate-adapted conservation strategies through its climate adaptability analysis. Conservation planning yielded key linkages and corridors;
- The GeosInstitute through the work on Fresno and surrounding counties climate adaption plan provided details on local vulnerabilities and stakeholder views on solution-based adaptation strategies.

Additional technical information is needed to fully support the strategies and projects (feasibility and meeting plan objectives) or to better understand the status of the resources.

12.2 Data Needs

Stakeholders have identified a critical need for study to increase understanding of the hydrologic capacity of the region. Appropriate water management strategies (and associated land and resource management policies) are challenging and prone to error if they are developed in the absence of this information. The California Water Plan has little useful data for the foothill/mountain portion of the Tulare Lake region. No groundwater management plan has been done for the region, mostly because the funding for accomplishing such (AB3030) plans was focused on groundwater basins and the region's groundwater is almost entirely stored in hard rock fractures. Representatives from the Southern Sierra Regional Water Management Group met with DWR representatives to discuss the possibilities of working together to build more knowledge about this area. The South Central Region staff stated that it was their intent to request funding to conduct special studies to address the local water management needs of the watersheds and communities in the Sierras. However the availability of funding and resources for such studies is uncertain and may take some time. DWR staff did state that they have current capacity to provide technical assistance to the Southern Sierra group as it moves forward with its planning process. Some of the assistance could come as technical advice concerning project scope and objectives, data gathering and evaluation, and participation in technical and public meetings.

12.3 Recommendations

There are at least three existing or potential efforts within the region to collect data and develop tools for regional analysis. These include:

- **The Forest Service's 'Cumulative Watershed Effects'(CWE) analysis database,** which lists existing projects on Forest Service land and their individual impacts on the watershed. When a new project is proposed, the cumulative effects of the proposed project on top of the existing project impacts can be analyzed according to

a specific type of 'risk' model. The Forest Service model is set up in specific ways that may not be appropriate for some other agencies or other applications. However, the database of projects and impacts will at least be useful for other environmental impact analyses that will take place within the region. There may be other CWE models in the region which can add to the database of existing projects and impacts.

- **The SSCC Climate Change Information Clearinghouse**. The Southern Sierra Conservation Cooperative is a collaborative group consisting of federal land management entities within the region, led by Sequoia/Kings Canyon National Park. The SSCC has a grant to create an information clearinghouse for the South Sierra region with a focus on climate change impacts and mitigation. The goal is for these agencies to be able to make better land use decisions to respond to climate change challenges, including increased risk of fire, modification of habitat, etc. The funding SSCC has obtained is only sufficient to conduct an assessment of potential users and to propose a design for the system. Additional funding will be needed to implement this project. Also, much of the information in this system will be confidential and not available to those outside of federal agencies. A working version of the 'Conceptual Proposal to Establish a Southern Sierra Conservation Cooperative to Collaboratively Adapt to Accelerated and Unprecedented Climate Change' is attached (see Attachment 4). The SSIRWMP will continue to coordinate with this effort to assure consistency and best use of resources.
- **National Science Foundation's Southern Sierra Critical Zone Observatory based out of UC Merced.** The Southern Sierra CZO is a community platform for research on critical-zone processes across the rain-snow transition in the mixed-conifer forest of the Southern Sierra Nevada. While this elevation range has characteristically rapid seasonal changes, going from snow cover to wet soil to dry soil over a 1-2 month period, climate warming will shift this transition period earlier or eliminate it entirely at the current transitional elevation. The characteristic spatial differences along gradients offer the opportunity to substitute space for time, making the CZO an excellent natural laboratory for studying how critical zone processes respond to perturbations, and particularly how the water cycle drives critical zone processes. This project includes a digital library for .tsv files, including metadata. A relational database interface is under development.

The survey implemented by the Planning Committee identified the need for some tool which would streamline the complex analysis involved in determining cumulative effects and/or changing conditions. Ideally this tool would integrate GIS capabilities. All of the projects listed above provide elements that would be useful in such a system, but neither are appropriate for use by the general public. The creation of such a data management tool

will be a complex task and will require both resources and time that exceed the IRWM Planning process. However it would be valuable to take the first steps toward development of such a tool. These first phase tasks will include an assessment of potential users including such questions as:

- What data will be useful for them to have;
- Who will use it (what positions in the organization);
- What are their skill sets;
- What questions would they ask;
- What is the current format of the data and what would it take to put it in electronic/GIS format;
- What kind of decisions do these potential users make now and what information do they use to make it?

Based on this assessment, a scope of work for the design and implementation of such as system can be developed. This assessment and design/scope will make it possible for the South Sierra IRWM to seek additional funding to make this planning tool a reality. Such a tool will provide an important continuing resource to assist integrated regional planning efforts in the future.

Chapter 13 - Finance

This chapter includes identifying and evaluating potential funding sources for Plan updates, RWMG administration, grant applications, technical studies, implementation projects, and project operation and maintenance. It also explores long-term sources of funding, such as general funds, rate based funds, or regular fees charged to each member.

The current funding for the program comes from grants from agencies, individuals, and non-profits. To date, the RWMG received a $50,000 Sierra Nevada Conservancy grant to start up the program, conduct the outreach assemble technical data sources, hold public meetings and write the initial planning grant application to DWR and assemble many of the components of the Plan. This initial grant was leveraged with in-kind services from consultants and participants in excess of $400,000. The Sierra Nevada Conservancy stepped forward to provide an additional $13,000 for professional facilitation when the RWMG was awarded a DWR facilitation services contract and beginning the contract was delayed. Facilitation enabled the group to submit another application to DWR for planning grant funds. The application was successful in the amount of $580,000. The RWMG requested for additional facilitation services from DWR also in the amount of approximately $50,000. Up to the beginning of 2013, the RWMG has been successful in acquiring $643,000 in grants for planning activities. In addition, stakeholders have contributed approximately $8,000 in cash for grant writing and facilitation. Together with the in-kind contributions, the total cost for planning activities during the period 2008-2015 will be approximately $1.1 million.

The implementation program is expected to cost an additional $400,000 for implementation projects. In order to submit the implementation grant application project proponents are required to contribute in-kind services, cash and specific grant application products.

The current model the SSRWMG employs only requires participants to attend meetings, designate participants, but does not set a minimum in-kind or financial contribution.

Financial agreement

The RWMG may agree to enter into a financial agreement as one way to support the activities of the RWMG.

Purpose

The purpose of a financial agreement is to provide a framework for RWMG members to contribute to the process such that, collectively, they provide the financial means to run the program sustainably.

Duration

The financial agreement will have a specific duration and will need to be periodically reviewed and renewed. Initially, this may need to be reviewed annually, or at a minimum, when the RWMG updates the IRWMP. The cost-share schedule can take a variety of forms:

1. Can be based on services provided (exclusively manage water, manage or provide goods and/or services other than water management, no such services);
2. Can be based on total estimated number of water/sewer connections, and proportional contributions;
3. Minimum contribution, if desired;
4. May include waiver for member entities for whom a financial contribution constitutes a hardship;
5. If the RWMG begins a cost-share agreement, it will need to develop a process for reallocating costs if membership changes;
6. The administering body for financial contributions and records will be the grantee for the planning grant and implementation grant (Sequoia Riverlands Trust);
7. Accounting and reporting, including identification of funds to cover the costs of an audit requested by the RWMG, will be covered as part of the administration of grants;
8. Cost-share contributions should not impact decision-making because the values of the Region indicate that there should be no specific authority provided any other body other than the RWMG.

Schedule, process and the party responsible for preparing an annual budget

During active planning and implementation, the grantee will prepare budgets for the Coordinating Committee and RWMG to review. This will occur as regular or quarterly updates and summarized in annual reporting.

The process for updating project cost estimates includes the project proponent updating and bringing changes to the RWMG.

Auditing

Regular auditing may be needed during the planning and implementation programs. The costs for the auditing should be included in grant proposals so that auditing is covered under administrative expenses.

Additional requests for details on budget or expenditures may be requested during public comment periods or requests may be made to members on the Coordinating Committee.

Information on funding opportunities

The RWMG brainstormed on several occasions planning and implementation funding ideas. Below is a summary of the results of the funding discussions:

- National Forest Foundation – there are two relevant funding programs:
    1. Capacity – The SSRWMG has applied for funding for collaborative work and capacity to support planning and implementation;
    2. Planning - The SSRWMG has applied for funding for collaborative work to support the IRWMP writing.

    Neither of the funding requests were successful.
- Rose Foundation (grants for planning);
- Sierra Nevada Conservancy – funded initial start up and bridge facilitation services – $63,000;
- Audubon California;
- Resources Legacy Fund Foundation – submitted a one-page summary and was presented by Conservation Strategies Group. The request was unsuccessful.
- National Fish and Wildlife Foundation – fisheries and meadow programs. The SSRWMG has applied for funding for collaborative work to support meadow restoration. Funding requests were unsuccessful.
- California Edison;
- PG&E;
- Sloan Foundation;
- Trout Unlimited;
- Fly Fishers for Conservation;
- Fresno Flyfishers;
- River Network;
- The Nature Conservancy;
- Sierra – Cascade Land Trust Council;
- Ducks Unlimited;
- REI;
- Patagonia;
- Cabella;
- Bass Proshop;
- Chambers of Commerce;
- PUD's;

- Verizon;
- RWQCB;
- NRCS;
- Coors Foundation;
- Bureau of Reclamation;
- Bureau of Land Management;
- California Bay – Delta Authority;
- Rotary;
- Siroptimus;
- Kern County Water Agency;
- Tule River Tribe;
- RCD's;
- Mountain Home State Forest.

During planning activities scheduled to begin in mid-2013 the planning firm will continue identifying and evaluating potential funding sources for Plan updates, RWMG administration, grant applications, technical studies, implementation projects, and project operation and maintenance. Work will also include exploring long-term sources of funding, such as general funds, rate based funds, or regular fees charged to each member. The national grant database eCivis will be used to identify potential sources of funding besides Proposition 84 and 1E. The certainty of each funding source, requirements and guidelines for each source and the strategy for applying for funding and optimizing access to the sources of funding will be evaluated.

Chapter 14 - Coordination and Collaboration

This chapter includes a process to coordinate with stakeholders in the region, including but not limited to: federal, state and local agencies, landowners, NGOs, DACs and Native American Tribes. This section will also include description of coordination with neighboring regions.

SSIRWMP Mission

The mission of the Southern Sierra Regional Water Management Group is to provide a forum to discuss, plan and implement creative, collaborative, regional, integrated water/natural resource/watershed management actions that enhance the natural resources and human communities of the Southern Sierra Region.

Regional Vision

The vision of the Southern Sierra Regional Water Management Group is that the southern Sierra will have healthy, sustainable watersheds, with vibrant economies, adequate water supplies, and sufficient capacity to:

- engage in collaborative processes,
- obtain resources to address water and natural resource issues,
- construct and implement plans and projects, and
- resolve regional and local conflicts and issues in a consensus-based, voluntary and non-regulatory manner.

SSIRWMP Values

In order to realize its mission and regional vision in a transparent and inclusive manner, the SSIRWMP values the following as means to those ends:

- Stakeholder and public input to natural resource decision-making;
- Consensus-based decision making;
- Inclusiveness and transparency;
- Science as a basis for decision-making and natural resource management;
- Respect for private property rights;
- Respect for the public trust;
- Equity and fairness in resolution of water conflicts and in developing mutually beneficial approaches and results;
- Integration of management entities, strategies and benefits;
- Coordination with adjacent regions;

- Sharing of data, information and knowledge in a variety of ways to meet the needs of the stakeholders and the public at large.

Chapter 15 - Impact and Benefit

This chapter will include identifying potential impacts and benefits of plan implementation within the region, and between regions. The RWMG, analyzed the plan and developed a discussion of the aggregated benefits of plan implementation, as well as an analysis of possible impacts (economic, environmental, and others) that would require mitigation or justification. This effort is not similar to preparing a CEQA document, and is instead a discussion of the relative merits and costs of implementing the plan. The impact and benefits analysis is organized by watershed and include DACs, environmental justice concerns, Tribes and climate change. Other areas of consideration will include water supply, water quality, groundwater, water conservation, watershed rehabilitation, habitat improvement, flood management, and other areas identified by stakeholders or RWMG members.

Specific impacts and benefits – The specific impacts and benefits that will result from this planning process and the resulting Plan fall into four categories: 1) the projects and strategies implemented as part of the implementation of the plan:

- Ecosystem restoration and protection;
- DAC water supply and quality protection and improvement;
- Tribal involvement and needs;
- Adapting and mitigating climate change impacts;
- Hydrological studies and understand the unique fractured bedrock aquifers.

This information, strategies and benefit will be incorporated in local planning documents such as general plans, forest and park plans and the California Water Plan, providing local, regional and statewide benefits; 2) the issues, data and analyses developed in the plan; 3) the processes by which future proposals will be developed and prioritized for funding ; and 4) the working relationships within a broad community of stakeholders. These will include at a minimum:

- Better access to regional data, studies and reports for more effective, coordinated and collaborative planning by stakeholder agencies;
- Improved regional resource management through coordinated policies and projects;
- Better integration of water related issues and development of multi-benefit resource management strategies;
- Increased knowledge (agency and public) of the key regional issues and concerns, especially the impact of climate change;
- Much improved stakeholder capacity to obtain funding and implement resource management;

- Much improved DAC capacity to obtain funding and implement water improvement plans;
- Consensus-based, collaborative working relationships that help prevent conflicts over resources and funding;
- Dispute resolution processes already in place should disputes arise.

During planning activities scheduled to begin in mid-2013 the planning firm writing the plan will further identify potential impacts and benefits of plan implementation within the region, and between regions. Working with the RWMG, the planning firm will analyze the plan and develop a discussion of the aggregated benefits of plan implementation, as well as an analysis of possible impacts (economic, environmental, and others) that would require mitigation or justification. This effort is not similar to preparing a CEQA document, and is instead a discussion of the relative merits and costs of implementing the plan. The impact and benefits analysis will be organized by watershed and include DACs, environmental justice concerns, Tribes and climate change. Other areas of consideration will include water supply, water quality, groundwater, water conservation, watershed rehabilitation, habitat improvement, flood management, and other areas identified by stakeholders or RWMG members.

Appendix I

Memorandum of Understanding
Southern Sierra Regional Entity
(Date of Signing) 2009

This Memorandum of Understanding (MOU) is entered into by and among the members of the Planning Committee with regard to the formation of the Southern Sierra Integrated Regional Water Management Plan (IRWMP). The overarching vision of the IRWMP is to meet the integrated water needs of the people and watersheds of the South Sierra IRWMP region now and into the future. The IRWMP will be developed in three phases: 1) a formation (launch) phase to develop and submit an application to the California Department of Water Resources (DWR) for a Planning Grant; 2) a planning phase to develop the Southern Sierra IRWMP and; 3) an implementation phase to implement the plan. The Southern Sierra Regional Water Management Group (hereinafter referred to as the "Southern Sierra Planning Committee" or "Planning Committee") will be realized through this MOU for the purpose of phases one and two of the IRWMP.

1 Purpose

This MOU is a statement of mutual understanding among the Planning Committee members to acknowledge the intentions of the parties and provide for cooperative action regarding:

☐ The roles and responsibilities of the parties in IRWMP formation, including the sources of funds and in-kind technical assistance

☐ The structure that will be used to exchange information with the Southern Sierra Planning Committee, Coordinating Committee, and other interested parties, and the public to provide for technical review and public support for formation of the IRWMP.

☐ The general work plan that Southern Sierra stakeholders will complete to form the IRWMP.

1.1 Duration of this Memorandum of Understanding

This MOU will remain in effect from the date of signing for 3 years or until replaced by another form of agreement by the Southern Sierra IRWMP Planning Committee.

1.2 Southern Sierra Preamble from the IRWMP

This IRWMP is not intended to, and it does not, impose legally binding requirements on the entities that adopt or participate in the IRWMP. The IRWMP's purpose is to summarize the

process and the plan developed by the Southern Sierra Region stakeholders to meet their common goals of achieving sustainable water supplies and uses, improved water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy.

Although the IRWMP refers to many legally binding statutory and regulatory provisions—such as general plans, zoning ordinances, water quality plans, and various permits, licenses, and approvals; its purpose in doing so is to ensure that the IRWMP is consistent and compatible with those existing legal obligations. Rather than adding to or modifying the present legal and regulatory environment, the IRWMP is intended to streamline and improve the stakeholders' ability to operate and succeed within that environment. Thus, the IRWMP provides guidance to, but does not impose any mandates upon, the water agencies, land use agencies, local governments, watershed organizations and others who adopt the IRWMP.

2 Background

2.1 IRWMP Formation

The Southern Sierra Planning Committee intends to launch an IRWMP Planning process, which will culminate in submitting a Planning Grant Proposal to DWR soon after final guidelines are released.

2.2 IRWMP Adoption

Any organizations, agencies or individuals that support the Southern Sierra IRWM Plan may adopt it. These include such organizations as water agencies, conservation groups, agriculture representatives, businesses, tribal groups, land use entities, and local, state, federal agencies and private entities with an interest in the Southern Sierra.

Southern Sierra IRWMP Geographic Boundaries

The Southern Sierra IRWMP boundaries will include the foothills and mountain headwaters regions of the Kern, Tule, Kaweah, Kings, and San Joaquin watersheds. These watersheds cover the Sierra Nevada portion of Madera, Fresno, Tulare, and Kern Counties. The primary boundary includes the Sierra Nevada Ecosystem Project (SNEP) boundaries, but is adapted to sync with neighboring IRWMP efforts.

- To the east, the Southern Sierra IRWMP boundary is defined by the Sierra Nevada crest.
    - Rationale: Waters flowing to the west from the Sierra crest are source waters for foothill uses and management. Precipitation falling west of the crest drain the western slope of the mountain range and are connected hydrologically with the Tulare and San Joaquin basins.
- To the north, the Southern Sierra IRWMP is defined by the Upper San Joaquin watershed.

- Rationale: The upper San Joaquin River basin is split between Fresno and Madera Counties, but the river is managed across counties. The issues on either side of the county line are similar, but contrast sharply with downstream users in intensive agricultural areas outside of the Sierra Nevada Region. The San Joaquin watershed shares many of the same issues with watersheds further south in the region.

- To the west, the Southern Sierra IRWMP is considering a boundary including the foothill areas of the region's watersheds.
  - In the Kings River Area, the SSIRWMP boundary extends the District boundaries of the Tri Valley, Orange Cove, Hills Valley Water Districts east of the towns of Orange Cove, Orosi and East Orosi. East of the City of Fresno, the boundary extends to the boundaries of the Fresno Metropolitan Flood Control District, the International Water District and the Garfield Water District.
    - Rationale: This boundary was negotiated with the Upper Kings River Forum Regional Water Management Group to match UKRF boundaries.
  - In the Kaweah Delta area, the SSIRWMP boundary extends to the Kaweah reservoir or the 600-foot contour in the Kaweah River Drainage. Further, the boundary follows the RWQCB Irrigated Lands Program and generally follows surface water ground water usage boundaries. In the aquaculture/Lewis/Avocado area, the boundary will be the 600' elevation contour and squared to section lines; the agriculture north of Elderwood will be in the KDRWMG. In Davis Valley, the Westside has small, irrigated lands while the east and the north are rangeland. The boundary will follow section lines in these areas. In Dry Creek, the boundary will follow land use: irrigated lands will be part of the KDWMG and grazing land will be in the SSIRWMP. In Mehrten Valley, the 600' contour will be the guide, most of the valley will be in KDRWMG. In Yokohl Valley, most of the western valley will be in the KDRWMG while the eastern portion of the valley will be in the SSIRWMP. In Round Valley, east of Lindsay, the KDRWMG will include a few small areas east of the ILP, the boundary will again be based on land use and squared to the section lines
    - Rationale: This boundary was negotiated with the Kaweah Delta Water Conservation District Regional Water Management Group to match KDWCD boundaries.
      .
  - In the Tule River Area, the SSIRWMP boundary includes the Tule River Indian Reservation and down to approximately the 600-foot contour in all forks of the Tule and squared to section lines. The Deer Creek Tule River Authority planning area will follow irrigated lands while the SSIRWMP will follow rangeland.
    - Rationale: This boundary was negotiated with the Deer Creek-Tule River Authority Regional Water Management Group to match that region's planning boundaries.

- To the south, the Southern Sierra IRWMP boundary is defined by the Tulare-Kern County line.
    - Rationale: the Kern watershed's water resources will be managed by both SSIRWMP and Kern County Water Agency IRWMP. The two entities will work collaboratively in the watershed across the county boundary.

2.3 Planning Horizon

The Southern Sierra planning and implementation horizon is approximately thirty years into the future, in the range of 2038-2040. However, many Southern Sierra discussions and actions will be guided by a longer time horizon of up to fifty years into the future.

2.4 Joining and Leaving the Southern Sierra IRWMP Planning Committee

Any water stakeholder organization may join the Southern Sierra IRWMP as part of the Planning Committee (see below for description). Water stakeholders could include, but are not limited to such organizations as: water agencies, conservation groups, agriculture representatives, businesses, tribal groups, land use entities, and local, state, federal agencies and private entities with an interest in the Southern Sierra. A group who wants to join the Southern Sierra IRWMP should notify the Planning Committee of their intent to join and sign this MOU to signify their good faith effort to join. Any entity who would like to discontinue their participation in the Southern Sierra IRWMP
may do so at any time. This MOU is non-binding and non-regulatory. The Southern Sierra IRWMP Planning Committee only asks that any member who wants to leave, notify the rest of the Planning Committee at which point they will no longer be a member of the Planning Committee of the Southern Sierra IRWMP.

3 Program Management Structure

3.1 Planning Committee

The Planning Committee is the decision-making body during the SSIRWMP formation process. In that context it will oversee and approve major programmatic decisions such as funding applications and performance measures. The Planning Committee will set the overall strategic direction for formation of the IRWMP. During the planning phase, the Planning Committee or its designated Work Groups will meet at least every other month.

3.1.1 Membership

The first Planning Committee membership will be comprised of those who sign this Memorandum of Understanding. These members will commit to approximately three years on the Planning Committee or until the SSIRWMP is complete.

The Planning Committee strives to ensure its membership represents a broad range of

interests, including: water supply, water quality, environment/habitat, recreation, agriculture and ranching, resource management, hydropower, cities/counties, sanitation, other water resource management areas, economically disadvantaged local communities and individual local stakeholders interested and willing to participate. In order to cover these interests, members may include, but are not limited to: water agencies, resource agencies, conservation groups, tribes, agricultural and ranching interests, cities, counties, education organizations, disadvantaged community representatives, private landowners, and businesses.

Planning Committee membership will be comprised of those who sign this MOU before submission of the planning grant proposal. Planning Committee members must be committed to ensuring long-term ecosystem health of the areas watersheds, water supply, water quality, involvement of the local communities, especially disadvantaged communities; and the protection, preservation and restoration of natural resources of the Southern Sierra region; and agree to work constructively with others.

The Project Manager will check in with Planning Committee members on regular basis to reconfirm their intent to actively participate and their primary representative. This will not be binding or require the member to re-sign the MOU. This activity is merely intended to give the Project Manager and Planning Committee the most updated list of active Planning Committee members and primary and alternate representatives. Membership in the Planning Committee may change to accommodate evolving circumstances, such as changes in individual organizational capacity or participation.

Planning Committee members agree they will strive to support the Southern Sierra IRWMP through a variety of supporting activities, which may include in-kind contributions and/or funding. 3.1.2 Representation

Each member organization will identify their lead representative for the Planning Committee and will make their best effort to attend Planning Committee meetings to make decisions. Planning Committee members may choose to identify alternates but they are encouraged to have one representative attend the IRWMP Planning Committee meetings for consistency.

3.2 Coordinating Committee

The Coordinating Committee, appointed by the Planning Committee, is a smaller, representative group of the Planning Committee that meets between Planning Committee meetings to assist staff with process planning, recommendations for process modifications, communications, and other issues for which staff needs advice. The Coordinating Committee may also provide more consistent fiscal oversight in helping to manage the IRWMP with the fiscal sponsor. Ultimate decision-making still resides with the Planning Committee. Membership in the Coordinating Committee may change to accommodate evolving circumstances (such as changes in individual organizational capacity or participation history) by consensus of the Planning Committee. The Coordinating Committee meets every month during planning stages and then every other month thereafter. This schedule could change again during implementation planning.

The Coordinating Committee may play a role in developing substantive proposals and policy, at the request and subject to the approval of the Planning Committee, but has no decisionmaking authority.

4 Formation Funding

4.1 Funding

Funding for the launch and planning phases will come from grants. Southern Sierra IRWMP anticipates that financial support for the regional entity will ultimately come from projects funded through the Southern Sierra IRWMP, but during the formation period (the formation period will end with a planning grant from DWR or other organization) will come from a portion of the launch and planning grants.
The Planning Committee agrees they will strive to support the Southern Sierra IRWMP through variety of supporting activities during the formation period.

4.2 Fiscal Agent

Fiscal Agent for IRWMP Launch
Sequoia Riverlands Trust shall serve as Fiscal Agent for the Southern Sierra IRWMP Launch phase. Duties include administering grant funds, coordinating meetings for the Coordinating Committee and Planning Committee, making meeting notes and notices publicly available, maintaining a webpage where IRWMP documents can be accessed.
Fiscal Agent for Planning Grant
The Planning Committee will choose a Fiscal Agent for the Southern Sierra Planning Grant Proposal to DWR and the Planning Phase. This entity will have custody and responsibility for administering all funds of the Southern Sierra regional entity, including without limitation deposit and disbursement of said funds and accounting of all business transactions of theregional entity. Fiscal oversight will still be performed by the Planning Committee and Coordinating Committee.
Any budget line item change over $1,000 should be considered by the Coordinating Committee, as the fiscal oversight of the IRWMP.
Any budget line item change over $10,000 must be reviewed and approved by the Planning Committee
Annual Financial Reporting
At the close of each calendar (or fiscal) year, the fiscal agent(s) and individual project partners shall provide a complete accounting of fiscal activity related to Southern Sierra IRWMP and associated projects to the Planning Committee.

5 Public Outreach and Participation

5.1 Planning Committee Meetings

The Planning Committee will meet at least every other month and schedule additional meetings if necessary to ensure effective planning of the SSIRWMP. All Planning Committee meetings are open to the public. Interested parties are welcome and encouraged to attend to share concerns about the Plan and learn about the IRWMP. Highlights from the Planning Committee meetings shall be distributed to the Southern Sierra Planning Committee and posted on the web for public viewing.

5.2 Public Forum / Interested Parties

The public forum refers to the general public and broad range of organizations interested in the Southern Sierra process that seek information about Southern Sierra activities either by attendance at meetings or through other means of communication. The Southern Sierra IRWMP maintains an interested party or stakeholder email list. Email list participants receive notice of all Southern Sierra meetings and all other announcements about the Southern Sierra planning process.

5.3 Public Noticing and Transparency

Southern Sierra meetings are noticed via an inclusive email list discussed above. In addition, Southern Sierra IRWMP will begin sending meeting announcements to all the public agencies involved in the process and encourage them to post Southern Sierra Planning Committee meetings on their web pages and to announce through agency noticing procedures. Planning Committee member entities are not responsible for compliance by Southern Sierra with public agency noticing requirements. The Southern Sierra IRWMP shall maintain a publicly accessible website displaying a calendar of meetings, agendas, meeting notes, list of participants, and when appropriate, a brief description of accomplishments, partners and overall mission of the IRWMP.
In preparation for Planning Committee meetings, which will involve decision-making, the Planning Committee will be noticed that there is a decision-making meeting 2 weeks in advance of the meeting. This notice can be by email with the agenda if available at that time.

5.4 Briefings and Outreach

Southern Sierra IRWMP stakeholders representing their own organizations regularly conduct briefings with local elected officials and other organizations interested in Southern Sierra or in which Southern Sierra IRWMP would like to extend its reach. Southern Sierra IRWMP periodically prepares briefings materials and makes presentations at conferences and meetings. Only the Project Manager or a designated representative may make public statements on behalf of the Southern Sierra IRMWP as an entity.

6 Planning Committee Decision Making

6.1 Decision Making Rule

6.1.1 Consensus as the Fundamental Principle

The Planning Committee shall base its decision-making on consensus (agreement among all members) in all of its decision-making. Working toward consensus is a fundamental principle of the Southern Sierra IRWMP process.

6.1.1.1 Definition of "Consensus"

In reaching consensus, some Planning Committee members may strongly endorse a particular proposal while others may accept it as "workable." Others may be only able to "live with it." Still others may choose to "stand aside" by verbally noting a disagreement, yet allowing the group to reach a consensus without them if the decision does not affect them or compromise their interests. Any of these actions still constitutes consensus. Since the IRWMP has no regulatory authority, any decisions it makes cannot regulate or force another entity against its will to take an action not in its interest. All decisions and projects will be made and developed under the consensus rule except as noted in Section 6.1.1.2 below.

6.1.1.2 Workgroups

Workgroups give input and recommendations to the Planning Committee. But all decisions will be approved by the Planning Committee as a whole.

6.1.1.2 Less than 100% Consensus Decision Making

The Planning Committee shall not limit itself to strict consensus if 100% agreement among all participants cannot be reached after all interests and options have been thoroughly identified, explored, discussed and considered. Less-than-consensus decision-making shall not be undertaken lightly. If, after full exploration and discussion, the Planning Committee cannot come to 100% agreement, it will use the less-than-consensus decision-making protocols as described below. For proposals or the Plan to be endorsed by the Planning Committee, it must pass the test identified in (a) below.

a) Broad Support of the Planning Committee Membership

The Plan or proposal must be endorsed by 75% of the total number of ***active*** members of the Planning Committee. (In other words, the Plan cannot be opposed by more than 25% of the total number of ***active*** members of the Planning Committee.) ***Active*** participation is defined in Section 6.1.1.3. 6.1.1.3 Definition of Active Participation by Planning Committee Members Active participation means regular attendance at Planning Committee meetings; regular participation in at least one Work Group or ensuring that a designee of the Planning Committee member's organization participates in a Work Group under the Planning

Committee member's close guidance; and reviewing planning and other written documents before discussions or decisions will be made. It is understood that occasionally Planning Committee members may need to miss a Planning Committee or Work Group meeting, or both meetings. If there is a question as to whether a Planning Committee member should be considered "active" for purposes of decision-making, the Coordinating Committee will make that determination by communicating with the member or determining whether the stakeholder is active or not based on recent participation.

7 Revisions to the MOU

Any revisions to this MOU must be made through the decision-making process outlined in the section above on decision-making.

Signature Page

Date: _____

_____ _____

Name (Signature) Print Name

_____

Organization

Primary Representative:

Email: _____

Telephone: _____

Address: _____

Alternative Representative:

Email: _____

Telephone: _____

Address: _____

Appendix II

Appendix III

Proposed IRWMP Governance Principles and Structure diagram

Planning Committee (20-30 members)

- IRWMP decision-making body
- Membership: water agencies, resource agencies, conservation groups, Counties, Tribes, etc. from geographic scope of IRWMP (open to those interested in water resources management)
- Size: unlimited size
- Decision-making: consensus-based with a default for supermajority vote with representation from major interests.

Coordinating Committee (8 - 10 members)

- Helps give guidance to IRWMP staff and consultants for managing IRWMP, preparation for meetings, drafting proposed policies, and planning tools
- Membership: representation from major interests and geographic area of IRWMP. Must also be members of Planning Committee.
- Size: Keep this Committee at a small workable number. Suggest 8.
- Frequency of Meetings: Meets every month during Planning stages and every other month thereafter.
- Decision-making: No decision-making authority. Proposes ideas to the Planning Committee for

Fiscal Sponsor (1 entity)

(DWR eligibility: Non-profit or public institution)

- Administration of grants and funds including contracting, reporting, invoicing
- Liability for grants awarded to fiscal sponsor on behalf of the IRWMP
- Leader in region and for IRWMP

Regional Authority (3 entities)

(DWR criteria: 3 public agencies, 2 with authority over water.)

- One of three entities will be fiscal sponsor for DWR Planning Grant
- Members of Planning Committee
- Could be members of Coordinating Committee but all don't have to be.
- Decision-making: none, these entities will make consensus decisions as part of the Planning Committee.

Appendix IV

Goal	Subgoals	Objectives	Climate Change impacts
Maximize Water Quality	Preserve and improve water quality related to watershed health	Protect waterways from sedimentation	
		Land use and water quality impacts from run-off	
		Wastewater treatment	Healthy watersheds can help to stabilize local climates, reduce severity of storms, and provide flood storage. A healthy watershed helps to filter pollutants and provides benefits to aquatic and adjacent terrestrial species. These species can help to sequester GHG's. Water quality improvements also ensure habitat for native species which are more adapted to the conditions of the Southern Sierra IRWMP.
		Mimimize nutrient loading	
	Implement BMPs to reduce agricultural impacts on water quality	Riparian protection from livestock in streams	Maximizing water quality by preventing agriculture from having negative impacts will keep aquatic ecosystems healthy for the same benefits above.
		Reduce contamination of	

		waterways from irrigated agricultural run off	
	improve drinking water quality	Treatment for naturally occuring contaminants, including uranium, arsenic, iron, magnesium, mercury and radon	Preventing drinking water from becoming contaminated means energy does not have to be spent to clean it again.
		improve infrastructure to reduce bacterial contamination	
Maximize Water Supply/ Water Supply Reliability/ Reduce Water Demand	Infrastructure	Evaluate and modify water infrastructure to improve efficiency	In general, maximizing water supply and reducing demand leaves more water available for natural systems. This makes the region more resistant to the effects of severe weather, runoff, flooding, drought, and helps to recharge groundwater.
		New infrastructure for disadvantaged communities (water supply and water treatment)	
	Groundwater resources	Assessment of groundwater resources in key areas	Recharged groundwater may be a potential source of water to reduce the impact of future shortages.
		Assessment of regional groundwater resources	
	Water Use Efficiency/ Water Recycling/	Water recycling opportunities	Reducing the demand for

	Water Conservation		water through education or conservation will increase available supply in the event of future shortages.
		Agricultural water use efficiency	
		Urban Water Use Efficiency	
	Improved Water Storage	Groundwater recharge	Improved storage directly provides a source of water as needed.
		Groundwater storage/ Conjunctive Use	
		Surface Water Storage - benefits and costs	
		Community Water Storage	
Fire Management, Flood Management and Healthy	Reduce risks of floods	Stormwater management	Floods wash away soils and cause economic damage which will increase unless managed appropriately.

Waterways			Floods are more likely with increased climate variability in the future so reducing the risk of floods will reduce the impact they will have.
		Land use policies	
	Healthy river flows for habitat, etc.	Maximize beneficial sediment transport	
		Flow augmentation, gravel augmentation, passage and floodplain connectivity	
	Floodplain preservation and development		
	Assess flooding areas and issues		
	Reduce wildfire risk	Vegetation management (see below)	Increased climate variability increases fire risk. This can cause damage to the soil, native species, and local economies. Reducing the risk of fire will help prevent the impacts of climate change from expanding.
		Land use policies	
Resource Stewardship	Protection of Habitat and	Regional Coordination for habitat	

	Biodiversity	enhancements	
		Conserve and Promote native species	Native species are better adapted to the SSIRWMP and help to retain water and mitigate flood and drought potential
		Protection of riparian habitat	
		Protection of wetland habitat	In general, protecting habitat and biodiversity provides the region with natural systems that are adapted to the threats of climate change.
		Conservation Easements	
		Disaster Restoration	
		Reduce invasive species, acquatic & terrestrial	
		Protection of areas of special biological significance and key corridors for plants,	

		insects and wildlife	
	Recreation	Water dependent recreation	
		Educate recreational users that have potential high impact	
	Relationship between Resource and Use	Minimum well production requirements for development	
		Comprehensive Land Use Planning	Understanding resources and how they are used will help to set a baseline for improvements. It will also help managers know what is available during fire, drought, floods, etc.
	Understanding Resources	Mapping Projects	
		Watershed Health Assessments	
		Educational Programs	
Water Policy/ Resolving Conflicts/ Coordinated Water Management/ Governance	Regional IRWMP	SSIRWMP MOU/Governance	
		Funding area JPA	
		Stakeholder involvement	
	Water Rights	Tribal water rights	Policy tools are another way to ensure that water gets used and managed

			appropriately to help offset climate change potential. Policy and governance tools are another system that can augment natural systems.
		Conflicts over pre-1914 rights, Upstream vs Downstream	Regional policy also helps to distribute the available resources to smaller stakeholders that may not otherwise have a voice.
	Conflicting demands: Agriculture, Development, Habitat	Impact of foothill development on downstream users	Can reduce the climate change contributions from man-made systems, including GHG emissions from vehicles, industry, and agriculture.
		SJR Restoration Program - maximize benefits and minimize negative impacts	
	Water Conflicts	Holding contracts specific to agriculture, modification for municipal/industrial use	
	Coordinated Monitoring		
	Consistency in Regional water policies	development and water availability	
	Water transfers	Transfers from willing sellers for environmental benefits	
	Funding to meet objectives	Develop a strategy to procure external funding for projects and programs	

Provide multiple benefits from management of water resources (Integrated Strategies)	Groundwater recharge and habitat protection		Goals in this section combine the climate change impacts of individual sections above
	Vegetation management, fire safety, habitat enhancement and water supply increase	Develop forest vegetation management policies and programs	
		Oak woodland vegetation management policies and programs	
	Flood control, habitat protection and recreation	Integrated flood plain projects	
	Sustainable Economic Development	Maintain working landscapes that benefit biodiversity and water resources while providing economic opportunities	
	Natural water storage		
Climate Change and Drought	Water supply and storage		
	Habitat and Biodiversity	Preserve connectivity for wildlife	
	Precipitation Enhancement		
	Energy Efficiency	Energy efficiency in water transport	

Appendix V – Project Information Form

SOUTH SIERRA REGION
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
PROJECT DESCRIPTION FORM
Project Identification Short Form

Note: This two page project description form gathers information about projects that can be used as examples in the South Sierra region's request for Intergrated Regional Water Management Planning funding. If implementation funding is obtained, more information will be required at a later date to submit this project for funding. This form may be printed, filled out by hand and sent to Bobby Kamansky at the P.O. Box 731, Three Rivers, CA 93271 OR electronically filled out and e-mailed to: southernsierrairwmp@gmail.com

General Information					
Project Name:					
Project Sponsor:					
If Joint Project, Other Partners:					
Project Website (if available):					
Project Contact Person:	Phone	FAX	Email		
Project Description					
Project Description (1 -2 sentences):					
Project Integration (Describe how the project does or could integrate with other projects in the Region):					
Project Source (Cite Plan(s) to which the project belongs [e.g., Watershed Master Plans, Capital Improvement Plans]):					
Project Location					
Descriptive (Description of property location etc.):					
Latitude/Longitude - info available at: http://geocoder.us/	Lat:		Long:		
Estimated Capital Costs: (Note estimated cost, if known OR check rough estimate):					
Project Cost:		<$100K ☐	$100K - $1M ☐	$1M - $10M ☐	>$10M ☐
Project Status (Check all that apply):		Conceptual ☐	In-Design ☐	Ready for Construction ☐	CEQA Complete ☐
Estimated Year of Construction:	Project ready and willing sellers available to consider offers.				
Project Benefits					
Water Supply: *New Supply Created (AFY)* (Check one)		☐ 1-100 AF	☐ 100-1000AF	☐ 1000+ AF	
Water Quality	Area Drained: and/or		Volume Treated:		
Public Access, Open Space, Habitat, Recreation (acres created/restored):					
Other: *(Describe X amount of benefit)*					

Project Criteria

Please review the project against the Statewide Priorities, Program Preferences, and Water Plan Management Strategies and place a check in the box if the project meets the criteria.

Statewide Priorities

- ☐ Reduce conflict between water users or resolve water rights disputes, including interregional water rights issues
- ☐ Implementation of Total Maximum Daily Loads that are established or under development
- ☐ Implementation of Regional Board (RWQCB) Watershed Management Initiative Chapters, plans and policies
- ☐ Implementation of the SWRCB's Non-point Source (NPS) Pollution Plan
- ☐ Assist in meeting Delta Water Quality Objectives; IRWM Grant Program Guidelines 6
- ☐ Implementation of recommendations of the floodplain management task force, desalination task force, recycling task force, or state species recovery plan
- ☐ Address environmental justice concerns
- ☐ Assist in achieving one or more goals of the CALFED Bay-Delta Program

Program Preferences

- ☐ Include integrated projects with multiple benefits
- ☐ Support and improve local and regional water supply reliability
- ☐ Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards
- ☐ Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance
- ☐ Include safe drinking water and water quality projects that serve disadvantaged communities

CA Water Plan - Water Management Strategies

- ☐ Agricultural Lands Stewardship
- ☐ Agricultural Water Use Efficiency
- ☐ Conjunctive Management and Groundwater Storage
- ☐ Conveyance
- ☐ Desalination
- ☐ Drinking Water Treatment and Distribution
- ☐ Economic Incentives
- ☐ Ecosystem Restoration
- ☐ Floodplain Management
- ☐ Groundwater/Aquifer Remediation
- ☐ Matching Water Quality to Water Use
- ☐ Pollution Prevention
- ☐ Precipitation Enhancement
- ☐ Recharge Areas Protection
- ☐ Recycled Municipal Water
- ☐ Surface Storage - CALFED
- ☐ Surface Storage - Regional/Local
- ☐ System Reoperation
- ☐ Urban Land Use Management
- ☐ Urban Runoff Management
- ☐ Urban Water Use Efficiency
- ☐ Water Transfers
- ☐ Water-Dependent Recreation
- ☐ Watershed Management

Appendix VI – Project Ranking Matrix

SOUTHERN SIERRA IRWMP SCORING CRITERIA AND RELATION TO STATE CRITERIA			
Southern Sierra Criteria	Pass/Fail	Purpose of Question	Relation to State Criteria
Support for SOUTHERN SIERRA IRWMP. *The project proponent must have formally adopted the plan.*	P/F	Demonstrates that the project proponent has formally adopted the IRWMP plan	• Adopted IRWMP Plan and Proof of formal adoption
Implementation of the SOUTHERN SIERRA IRWMP. *The project must address the values, goals, objectives and strategies identified in the IRWMP.*	P/F	To fund projects that directly support and further the implementation of the region's water management goals and objectives.	• Consistency with IRWMP standards • Objectives • Priorities and Schedule • Impacts and Regional Benefits • Implementation

Southern Sierra Question No.	Southern Sierra Criteria	Range of Points Possible	Scoring Standard	Purpose of Question	Relation to State Criteria
1	**Objectives.** Does the project contribute to IRWM Plan Objectives?	1-10	A higher score indicates that the project is expected to contribute to the achievement of more of the plan objectives.	Assists in prioritizing projects into the regional plan and ensures that the project will meet plan objectives	• Objectives • Priorities
2	**Resource Management Strategies.** How well does the project relate to the SSIRWM Plan Resource Management Strategies?	1-10	A higher score identifies a project that contributes to more resource management strategies that diversify the water management portfolio used to meet plan objectives.	Ensures a diversity of resource management strategies are implemented towards fulfilling plan objectives	• Objectives • Resource Management Strategies • Integration

Southern Sierra Question No.	Southern Sierra Criteria	Range of Points Possible	Scoring Standard	Purpose of Question	Relation to State Criteria
3	**Technical Feasibility.** Is the project based on a sound technical feasibility?	1-5	Higher scores indicate a thorough readiness to implement the project. Technical feasibility is related to knowledge of project location, water system, and geologic or hydrologic conditions. Lower scores could indicate gaps in data or information that could prevent a project's success.	Evaluate readiness to proceed, project feasibility, and obtain documentation.	• Technical Analysis • Plan Performance and Monitoring
4	**Disadvantaged Community.** Does the project address critical water supply and quality needs of a "disadvantaged community" as defined by the State?	1-10	A score of one to three will reflect the projects benefits to the community. A score of zero will be assigned if the project is not benefiting a disadvantaged community.	Identify projects that benefit disadvantaged communities	• Disadvantaged Communities • Impacts and Benefits • Ensure Equitable Distribution of Benefits • Stakeholder Involvement • Coordination
5	**Native American Communities.** Are there specific benefits to Native American tribal communities?	1-10	A higher score will be assigned to those projects that include strategies for addressing critical water supply and water quality needs of Native American tribal communities.	Identifies projects that benefit Native American tribal communities	• Improve Tribal Water and Natural Resources • Impacts and Regional Benefits • Ensure Equitable Distribution of Benefits • Stakeholder Involvement • Coordination
6	**Environmental Justice Considerations.** Does the project provide consideration for environmental justice or equality?	1-5	A higher score would address the important considerations for the SSIRWM of inequitable distribution of pollution and access to clean water and air, parks, recreation, and nutritious foods.	Encourages the equal distribution of resources to ensure that environmental benefits are fairly distributed	• Impacts and Benefits • Water Management Strategies and Integration • Ensure Equitable Distribution of

Southern Sierra Question No.	Southern Sierra Criteria	Range of Points Possible	Scoring Standard	Purpose of Question	Relation to State Criteria
					Benefits • Coordination
7	**Project Costs and Financing.** Are project costs documented? If so, what are they based on?	1-10	A higher score is based on documented project costs that are based on a feasibility study, conceptual idea, design, etc.	Determine if the project costs are within reason for this project	• Budget • Implementation • Financing
8	**Economic Feasibility.** Does the project describe a feasible program of financing for implementation of project?	1-10	Higher score based on documentation of firm financial commitments; clear resource commitments for ongoing monitoring, maintenance and operations; and a high percentage local match.	Evaluate readiness to proceed, clear financial commitments	• Financing • Budget • Implementation
9	**Project Status.** What is the status of the project? Is the project ready to proceed?	1-10	Higher scores would be assigned to projects that are implementable and well documented. Conceptual projects may also be included in the IRWM Plan because the planning horizon for an IRWM Plan is 20-years. Projects with low readiness may be developed or the RWMG may seek additional funding in order to develop the project to be ready.	Evaluates the readiness to proceed with a given project	• Technical Analysis • Relation to Local Water Planning • Relation to Local Land use Planning • Implementation
10	**Strategic Considerations.** Could a smaller/local project be strategically restructured to satisfy regional objectives?	1-5	The RWMG will review strategic considerations that may bring multiple benefit and greater integration to projects. In this way, local projects may be integrated for regional benefit and explaining when a single purpose project needs to be implemented in order to best implement an IRWM Plan.	Evaluate readiness to proceed, provide greater integration	• Implementation • Multiple Stakeholder Benefits • Coordination • Objectives

Southern Sierra Question No.	Southern Sierra Criteria	Range of Points Possible	Scoring Standard	Purpose of Question	Relation to State Criteria
11	**Climate Change.** Does the project address the effects of climate change?	1-10	Higher scores will be given to projects that specifically identify the impacts and benefits of climate change.	Does the project contribute to regional and state goals of adaptation for climate change	• Climate Change • Impacts and Benefits
12	**Greenhouse Gas Emissions.** Does the project contribute to the reduction of GHG emissions as compared to project alternatives?	1-5	Higher scores will be given to projects that, over the course of their life, will help the region lower GHG emisisons.	Considerations such as energy efficiency and reduction of GHG emissions are important when choosing between project alternatives	• Climate Change • Impacts and Benefits
Total # of points (Out of 100)	**Projects will be determined based on scoring from the 12 questions above.**				